

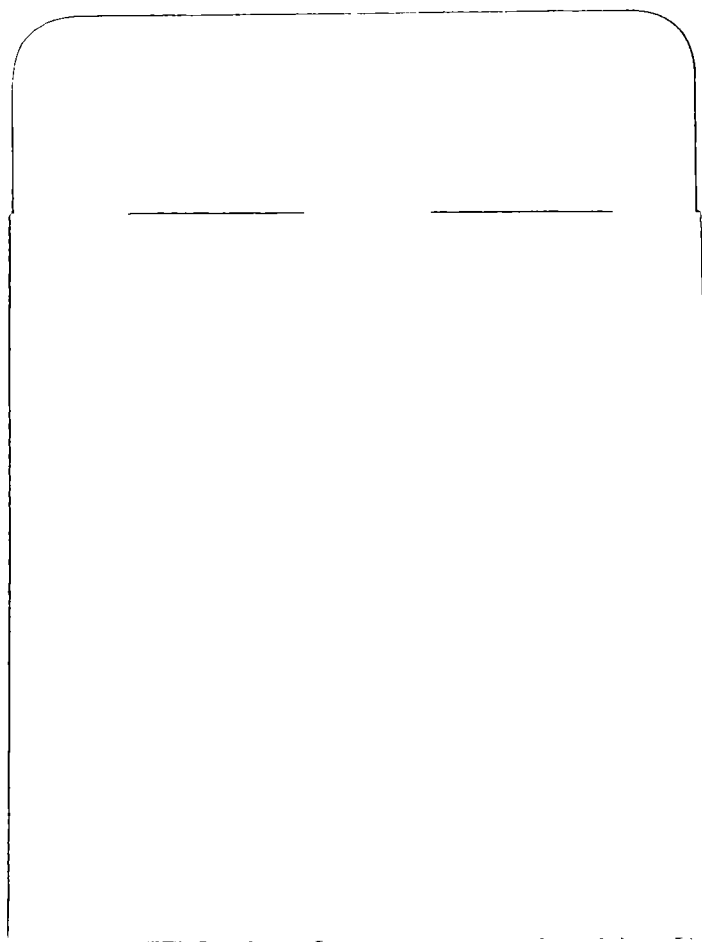
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Reference

DEPARTMENT OF THE ARMY FIELD MANUAL

MOTOR TRANSPORT OPERATIONS AND MOTOR TRANSPORT UNITS



HEADQUARTERS, DEPARTMENT OF THE ARMY
JUNE 1965



FIELD MANUAL }

No. 55-35 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., 23 June 1965

MOTOR TRANSPORT OPERATIONS AND MOTOR TRANSPORT UNITS

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CHAPTER 1

INTRODUCTION

1. Purpose and Scope

a. This manual is a reference on military motor transportation for use in planning and executing motor movements. It prescribes motor transport organizational and operational doctrine and presents techniques and procedures to be used in planning, executing, and controlling motor transportation operations. It discusses the organization, basis of assignment, capabilities, and employment of motor transport units.

b. This text is applicable without modification to nuclear and nonnuclear warfare.

c. Current NATO standardization agreements (STANAG's) applicable to military movements by motor vehicle are referenced by STANG number. Appendix II contains the referenced STANAG's.

d. Linear distances in this manual are shown in both U. S. customary units of length and metric equivalents. Appendix III is a metric conversion table.

e. Users of this manual are encouraged to submit recommended changes or comments to improve the manual. Comments should be keyed to the specific page, paragraph, and line of the text in which the change is recommended. Reasons should be provided for each comment to insure understanding and complete evaluation. Comments should be forwarded direct to the U. S. Army Combat Developments Command Transportation Agency, Fort Eustis, Va., 23604.

2. Types of Motor Movements

a. Present-day concepts of warfare envision the continual maneuvering of combat units over wide areas. Nuclear capabilities of modern armies dictate tactical dispersion and a high degree of mobility. Since motor transportation provides a great percentage of this

mobility, it is important that efficiency in motor movements be stressed at all times.

(1) Functionally, military motor movements are divided into two general classifications, tactical and administrative.

(a) *Tactical Movements* are those which exploit the mobility of motor transport for timely delivery of units and supplies to their destinations in the best formation and condition for the accomplishment of the mission. In tactical motor movements, unit integrity for tactical control, combat loading for ready availability on contact, and speed of movement are of greater importance than economy of cargo capacities.

(b) *Administrative movements* are those which make maximum use of available transport. Tactical considerations in administrative movements are of less importance than economical use of cargo capacities and operating personnel.

(2) Both tactical and administrative motor movements may utilize organic transportation, vehicles of attached or supporting units, or a combination of both. *Organic transportation* includes vehicles assigned to a unit by tables of organization and equipment (TOE), tables of allowances (TA), or equipment modification lists (EML). *Supporting or attached transportation* includes vehicles provided by supporting units.

b. Motor movements may be further classified by the degree of control exercised over them as follows:

(1) *Casual military movements*. Casual military movements consist of indi-

vidual elements proceeding more or less at will in the performance of routine functions of units.

- (2) *Organized military movements.* Organized military movements consist of units or supply convoys in which elements are grouped together for control.
- (3) *Indigenous traffic.* Indigenous traffic consists of refugee and local civilian traffic and casual non-U. S. military movements. The presence of such unorganized traffic may require control measures to restore efficient use of the road net.

3. Conditions Affecting Motor Movements

Military motor movements are affected by a wide variety of conditions over which planning and operating personnel have no direct control. These conditions can be anticipated to varying degrees, and provisions can be made for operations with these factors taken into consideration. All plans and operations must be sufficiently flexible to meet unpredicted weather, terrain, or tactical conditions. General provisions for operation under such conditions follow:

a. Civilian Controls. Motor movements made within the continental United States and usually those in the territory of a friendly nation are subject to civilian traffic regulations. Coordination with civil authorities is therefore necessary for proper clearances before motor movements are executed. Channels to effect coordination are normally prescribed in field standing operating procedures or local regulations.

b. Terrain and Climate. Conditions of terrain and climate may seriously restrict the mobility of motor vehicles (FM 5-36). Often special training is required and special equipment must be issued. Adequate training and

proper planning minimize the adverse effects of these conditions.

c. Availability of Road Network. Normally, a basic military road network is designated in the defense plans of NATO nations; this network includes routes selected to meet anticipated allied and national military movements and transport requirements (STANAG No. 2151, app II). However, in some areas a road net with highways and bridges suitable for all classes of military traffic may not have been established. Under these conditions, a route reconnaissance must be conducted to designate such a net and to determine engineer work required. This reconnaissance must be as thorough as time and the tactical situation permit. FM 5-36 may be used as a guide for route reconnaissance.

d. Tactical Conditions. In theaters of operations, particularly in the combat zone, tactical conditions must be given the highest consideration in the planning and execution of motor movements. Tactical conditions include all conditions imposed by the enemy, such as air, artillery, or CBR attack; raids; guerrilla action; and sabotage, as well as conditions imposed by the operational plans of our own forces. Basic provisions in plans and orders for movements under tactical conditions include march or convoy organization, command structure, and assignment or designation of adequate security detachments. Standing operating procedures for the defense of a column against ambush, normally based on the principle of a strong and immediate retaliatory action against the ambushing force, must be developed and understood by all personnel (FM 31-22); particular emphasis must be placed on defense of unescorted convoys. The introduction of chemical, biological, and nuclear weapons systems to the battlefield imposes a requirement for thorough training in defense against these forms of attack.

CHAPTER 2

ORGANIZATION OF MILITARY MOTOR MOVEMENTS

4. General

a. To exploit the increased ground mobility of military units and to make effective use of the road network, adequate control must be maintained over military motor movements; such control is provided through organization. This chapter deals with the organization of motor columns as operational units. This organization is based on international agreement (STANAG 2154), instructions from higher headquarters, and unit standing operating procedures. An appropriate degree of standardization must be provided to permit effective centralization of control when necessary. Units provided with organic motor transport develop great proficiency in the execution of road moves through movement exercises under a variety of conditions. Recurring problems are provided for in unit standing operating procedures.

b. Organization for highway regulation to provide for the allocation, scheduling, and control of motor movements over the highway net is discussed in FM 55-9.

5. March Organization

a. A march column includes all elements using the same route for a single movement under the centralized control of a single commander. A large column may be composed of a number of organized subdivisions, each under the control of a subordinate commander.

- (1) *Serial*. A serial is a major subdivision of a march column. A serial is organized as a single unit under one commander for purposes of planning, regulation, and control.
- (2) *March unit*. The march unit is the smallest subdivision of the column, normally corresponding to the smaller troop units such as squad, section, platoon, company, or battery. It moves

and halts under the direct control of a single commander using voice, visual signal, or radio.

b. All motor columns and organized elements thereof are composed of three functional parts: head, main body, and trail. The commander, to insure freedom of movement necessary to exercise proper command and control, has no prescribed place in the column. Details of column organization applicable to a particular unit are normally prescribed in unit standing operating procedures.

- (1) *Head*. The first vehicle constitutes the head of the column. It is marked with a blue flag by day and a blue light by night and carries the subordinate commander, who is known as the pace setter. The pace setter maintains the prescribed schedules and rate of march, leads the column on its assigned route, and checks in at scheduled points. He receives orders or changes in orders and advises the column commander, who issues implementing instructions as required.
- (2) *Main Body*. The main body, immediately preceded by the pace setter's vehicle, consists primarily of task vehicles carrying troops, equipment, and/or supplies. The main body may be subdivided into serials and march units for regulation and control, each being similarly organized with head, main body, and trail.
- (3) *Trail*. The last element of the column in order of march is the trail. The trail officer or noncommissioned officer represents the commander in such functions as prevention of straggling, discipline, march maintenance of vehicles, medical aid, checking on final clearance of the column at designated points, and taking action as required.

6. Control Personnel

a. Column Commander. The officer or non-commissioned officer in command of a column is responsible for its actions during a movement. He issues the orders to initiate the march and insures that instructions contained in standing operating procedures and march orders are complied with during the preparation for and conduct of the march. He must be free to supervise the movement of the column. The commander selects his position in the column on the basis of anticipated problems. When conditions and availability permit, the commander may use light aircraft to facilitate column control. From the air, the commander or his representative can easily note deviations from the prescribed formation, changes in traffic conditions, and divergence from the prescribed route and can take immediate corrective action. Aerial reconnaissance, concurrent with aerial column control, may also enable the commander to make timely adjustments to meet changes in the situation.

b. Control Officers and Noncommissioned Officers. Column control is maintained by command and staff personnel at all echelons within the column. Commanders of serials and march units are responsible for the operation of their elements of the column, each using his staff or representatives to assist as he may direct. The executive officer is usually responsible for notifying higher headquarters of any unavoidable delays or proposed changes in plan. Unit staff officers are usually assigned specific duties for the movement appropriate to their normal staff functions.

- (1) *Advance officer.* The advance officer is designated by the commander to precede the column so as to reconnoiter the route of march, selecting alternate routes or detours for bypassing road blocks or traffic jams with minimum delay. He instructs and posts organizational traffic control personnel and posts markers where necessary. He notifies proper authorities of the approach of the column and checks at highway regulation points for instructions or changes in instructions for the movement of a

column traveling on a dispatch route. The advance officer may also command a detachment sent forward for quartering, pioneering, and other details. He maintains contact with the commander by radio or other means to advise him of developments and to receive further orders or instructions.

- (2) *Pace setter.* An experienced officer or noncommissioned officer, often the unit executive officer, is selected by the column commander to act as his subordinate commander in the performance of the duties of the pace setter. The importance of these duties (para 5) makes the pace setter the chief control officer of the column or element thereof.
- (3) *Trail officer.* The trail officer marches at the rear of the column and checks vehicles, march units, or serials at the point of origin or the designated start point; posts necessary guards, warning flags, caution lights, or flares to warn traffic approaching from the rear when the column halts; picks up and returns to the head of the column all guides and markers posted by preceding elements; and prevents interference by overtaking traffic. He must also be alert to excessive accordion action, weaving, or other indications of a lack of discipline or driver fatigue in order to take prompt corrective action. In the event of an accident, he sees that the injured receive proper care, summoning medical aid if necessary; summons military and/or civilian police as appropriate; insures proper preparation of unit accident reports; and initiates preliminary investigations. In the absence of a trail maintenance officer, he is also responsible for march maintenance of vehicles and, in accordance with instructions from higher headquarters, for the decision to abandon vehicles.
- (4) *Trail maintenance officer.* The trail maintenance officer rides at the rear of his unit with maintenance person-

nel and equipment and acts within the limits prescribed by the operation order to maintain vehicles in serviceable condition. He should be familiar with the maintenance support plan for the area, including location of maintenance units, operation of road patrols, and current procedures for contacting the appropriate support unit for maintenance and recovery assistance. At halts, he proceeds along the column to inspect vehicles and to supervise maintenance operations. In a small column, the duties of the trail maintenance officer are usually combined with those of the trail officer. An experienced motor transport officer is usually selected for this duty.

c. *Other Control Personnel.* Depending on the size of the column and the requirements of the situation, control personnel may include the following:

(1) *Guides.* Signing and guide teams direct a unit or vehicles over a specified route or to a selected locality. These teams are normally provided by the moving unit. Although members of these teams may wear colored armbands for identification, they must not wear the armbands and cuffs of traffic control or movements personnel. Unit guides are placed in advance of the column by the advance officer and are picked up by the trail officer. Route signing and placing of guides on controlled routes must be under the responsibility of the authority in charge of movements on traffic in the area concerned (STANAG 2154). Signs must conform to accepted specification and design (STANAG'S 2012 and 2154).

(2) *Escorts.* Escorts accompany a column or convoy to assist its movement and to protect it from interference. The composition of the escort varies with the situation and anticipated problems of movement. Escorts may consist of military police (FM 19-25), civilian police, or other person-

nel assigned to accompany the column through congested areas or areas of possible traffic conflict; or armed guards, ground troops, or armed aircraft to protect the movement from sabotage, guerrilla activity, or enemy action; or of any required combination of the foregoing.

(3) *Patrols.* Under organizational control (para 9), patrol duties are performed by personnel detailed from the unit making the move. Under area control (para 9), patrol duties are usually performed by area military police. Patrols are used to provide liaison between key regulation or control posts and to provide frequent checks of critical points on the road net where traffic blocks or bottlenecks are most likely to develop. They may precede a column to stop or otherwise direct conflicting traffic, in which case they assume the functions of escorts. Their purpose is to facilitate movements in accordance with the traffic plan and the schedules prescribed by higher authority or by the traffic headquarters having area jurisdiction.

7. Control Identification of Vehicles

It is desirable to mark or otherwise designate vehicles of the column for control purposes. Such identification is subject to local conditions and is usually specified in standing operating procedures. Marking should be kept to a minimum consistent with its need in column control. Temporary markings should be easily removable.

a. *Unit Flags and Symbols.* Security permitting, headquarters vehicles of companies or similar units may display guidons. Message center vehicles of battalions or similar units may be indicated by distinctive symbols or panels displayed on the front, rear, top, or sides. When necessary for security reasons, guidons should be cased and symbols or panels covered or removed.

b. *Cloth Control Indicators.* Command and control vehicles of each element of a column are indicated by flags approximately 12 by 18

inches (30 by 45.7 centimeters) in size. The leading vehicle carries a blue flag; the rear vehicle, a green flag; and the vehicle of the commander, a white and black flag (STANAG 2154, app II). In areas where vehicles are driven on the left side of the highway, flags are mounted on the right side of the vehicle; otherwise, they are on the left. Flags may be at either the front or the rear of the vehicle, but they should be positioned so that they will not interfere with the vision of the operator or crew or any functional component of the vehicle.

c. Numbering of Vehicles. The number assigned to a movement serial (STANAG 2154, app II) is marked on the front and on both sides of each vehicle in the serial. The marking must be clearly visible from the ground and must not conceal other prescribed markings. Individual vehicles within the main body may be numbered in sequence to facilitate formation of the column and identification of individual vehicles. Such numbers may be drawn on sides and bumpers of vehicles with soft chalk crayons or may be indicated by prepared signs.

d. Special Markings on Vehicles. In addition to the markings described in *c* above, standard markings are prescribed for vehicles that require easy identification.

- (1) Vehicles carrying general officers may be marked with the appropriate conventional symbol on a plate attached to the right end of the front bumper and to the left end of the rear bumper (AR 746-2300-1). Flags indicating the rank of general officers may also be flown.
- (2) Armed Forces police vehicles and military police vehicles are marked prominently in accordance with the provisions of AR 746-2300-1.
- (3) Ambulances and other vehicles provided exclusively for medical purposes are marked in conformity with the rules of the Geneva Convention.
- (4) Vehicles of bomb disposal units have all mudguards painted red.
- (5) A plain red flag flown from any vehicle indicates danger.

- (6) Vehicles that have priority over other vehicles may be marked by an equilateral triangle of red border lines on a white background with a red symbol inside the triangle. This marking is displayed on the front and rear of the vehicle. This marking may be prescribed by any commander having area responsibility and is valid only in the area of the commander concerned. The symbol inside the triangle indicates the commander authorizing the use of this priority sign.

8. Column Communications

Adequate communication within a column is essential to effective command and control. The column is organized to facilitate communication by the means available. Unit standing operating procedure may designate the means and their use under specific circumstances. When conditions permit, the use of aircraft greatly facilitates column control. The operation order (STANAG 2141, app II) specifies security limitations. Methods of intra-column communication include the following:

a. Visual Signals. Visual signals are most commonly used for column control. These may be arm-and-hand, flashlight, or flag signals. They may be given directly by the commander to the entire march unit or may be relayed from vehicle to vehicle as in the case of standard driver's signals. Visual signals are easily understood and rapidly transmitted, and they can be used in all basic column maneuvers such as starting, stopping, changing speed, and changing direction (FM 21-60).

b. Audio Signals. Audio signaling is mainly used in conjunction with other means of signaling for column control. Whistles, horns, or bugles are used to attract attention, to warn personnel of further transmission of commands, and to spread alarms. Voice commands and verbal messages are classed as audio signals and are used when the situation permits. Aircraft equipped with loudspeakers may be used in audio signaling.

c. Radio Communication. When communication security permits and when vehicles are adequately equipped, radio is the principal

means of communication during a march. Radio provides the most rapid transmission of orders and messages between widely separated elements of a column. Its use is generally specified in orders, in unit standing operating procedures, and in signal operations instructions. Aircraft may be used to relay messages between FM radios on the ground in terrain that restricts direct communication.

d. Other Methods. Sign messages, written on a board and posted along the route or displayed by a guide in view of oncoming vehicles are often used to pass instructions to the mov-

ing column. The signs are posted from the head of the column and picked up as the rear of the column passes. Written messages may be delivered by guides along the route or by messengers. The use of messengers along a moving column is limited by the type and amount of traffic and by the type of vehicles available for this purpose. The use of aircraft is practical and effective for either the delivery of messages or the transport of control personnel to locations along a congested route since time is reduced and no additional ground vehicles add to the congestion.

CHAPTER 3

CONTROL OF MOTOR MOVEMENT

9. Types of Control

a. *Organizational Control.* Organizational control is always exercised during highway movements. This control is the responsibility of the commander of the organization or unit using the road. Organizational control insures observance of rules of the road, traffic laws and regulations, speeds, spacing, routing, schedules, discipline en route and at halts, and local security measures.

b. *Area Control.* Area control is a responsibility of the commander having area jurisdiction. This function is normally planned, implemented, and supervised by the appropriate traffic headquarters for highway regulations and by the provost marshal for traffic control. Area control is superimposed on organizational control. It is employed only to the extent necessary to insure orderly and effective movement of vehicles over the highway system.

10. Control Classification of Highway Routes

a. Highway routes are classified according to the degree of control demanded. The following classification of highway routes has been made for military operations.

- (1) An *open route* is one over which minimum control is exercised. No movement credit (STANAG 2154) is required for the use of an open route. Supervision is normally limited to military police traffic control at critical intersections, enforcement of standard traffic laws and regulations, and provision of necessary signs and highway markings.
- (2) A *supervised route* requires limited control by a central traffic authority (highway traffic headquarters). Traffic control is provided by military police traffic control posts and patrols.

A movement credit is required for any column of 10 or more vehicles or for any vehicle of exceptional size or weight. Usually, no prior correlation of individual march schedules is necessary for the use of the route by small units, although access to the route may be regulated as necessitated by the traffic situation.

- (3) A *dispatch route* is a route over which full control, both as to priorities of use and the regulated movement of traffic in time and space, is exercised. A movement credit is required for the movement of any vehicle or group of vehicles. Normally, a high degree of area control is required in addition to organizational control.
- (4) A *reserved route* is a controlled route set aside for the exclusive use of a designated unit or a specified type of traffic. When a route is reserved for a designated unit, the commander of the unit decides the degree of regulation and control that will be exercised. In addition to organizational control, military police traffic control may be required to deny the use of the route to unauthorized traffic.
- (5) A *prohibited route* or a *prohibited section of route* is a route or section of route over which traffic is prohibited.

b. Classifications in addition to those outlined above used in NATO operations are contained in STANAG 2151 (app II).

11. Methods of Movement

A fundamental for column command and control is the selection of a method of movement suitable to the situation and the degree of control necessary. In many instances, the

formation of columns or convoys may be impractical owing to the need for dispersion or for avoiding interference with other traffic over a specific route. In other cases, individual dispatch may not provide the security, control, or unit integrity required to perform the assigned military mission. The commander must decide which method is best for the mission and situation. The three basic methods of movement are as follows:

a. Close Column.

- (1) In close column operations, each vehicle in a march unit follows the vehicle ahead at a distance sufficient only to insure against accident. This distance is usually governed by a speedometer multiplier, but the casual "follow me" method is sometimes used. When this is done, drivers are instructed to follow the vehicle ahead as closely as safe driving practices allow (TM 21-305). The minimum distance between vehicles (gap), determined by stopping distances at the speeds allowed, is specified. A maximum speed is prescribed for vehicles regaining lost distances. Changes in speed are accomplished smoothly and gradually to insure safety and uniformity of column movement. The head of the column maintains its position en route by means of a time schedule or a minimum gap from the rear of the preceding unit. The at-halt gap between vehicles is determined by the tactical situation and traffic conditions and may be prescribed in the operation order. At halts, march units and serials should not close on the units ahead unless ordered to do so.
- (2) Column control and intracolumn communication are facilitated, and during daylight hours fewer guides, escorts, and route markers are needed. Close column is generally used in blackout operations and operations over poorly marked routes when visual contact between vehicles is essential.
- (3) There are some disadvantages con-

nected with use of the close column. Close-column formations do not provide dispersion for passive defense against enemy observation and attack. The strength and type of organization are readily apparent to hostile observation. Vehicles may arrive at destinations more rapidly than they can be handled without congestion. Careful scheduling and rigid control of traffic are necessary to avoid dangerous blocking of intersections. Greater driver fatigue is generally experienced in close column, and use of the route by other traffic is severely limited.

b. Open Column. In open column, distances between vehicles are increased to effect dispersion. In areas vulnerable to enemy action or under difficult operating conditions, adequate dispersion may be insured by prescribing traffic density in orders. An open-column formation increases the degree of passive protection from hostile observation and attack. It permits greater highway speeds with safety. The open column permits greater flexibility in highway utilization, both in planning movements and in making adjustments to meet changes in the tactical situation. It permits the concurrent use of highways by traffic moving at various speeds. There is a definite reduction in driver fatigue. Open columns are more difficult to command and control than close columns, and the distance between vehicles may make it difficult for drivers to maintain the prescribed spacing.

c. Infiltration. In infiltration operations, vehicles are usually dispatched individually, in small groups, or at irregular intervals at a rate that will keep the average traffic density down and prevent undue massing of vehicles. Each driver must be given detailed instructions regarding the route, running speeds, maximum speed, and other restrictions. The route should be clearly marked and, if possible, each driver should be given a strip map. Average distance between vehicles in the overall plan is determined initially by the rate at which the vehicles are dispatched. Thereafter, speeds and distances are regulated by individual drivers in conformity with operating instructions. Decep-

tion for the purpose of preventing the disclosure of a movement to enemy observers may be provided by intermingling various types of vehicles and by permitting passing within the column. When more than one movement is taking place over the same route at the same time, it is desirable to coordinate the rates of dispatch to achieve dispersion. Supervision of movement is effected by stationing regulation and control personnel along the route. It is important to post guides or markers to reduce delays en route and to prevent congestion at or near traffic bottlenecks or at destinations.

- (1) Infiltration provides the best possible passive defense against hostile observation and attack. It is therefore well suited to daylight operations. Under light traffic conditions, movement of individual vehicles is not materially affected by other vehicles on the road. Individual vehicles may travel at higher speeds. Cross traffic may move with less interference since traffic density is light. The use of this method permits the movement of a unit over a route on which traffic is too heavy for the unit to move at one time.
- (2) Some disadvantages are inherent in an infiltration movement. Time length of the infiltration march is greater than that of any other type of movement. Because of extended distances between vehicles, internal control is difficult. Drivers are usually unable to regulate their movements by the vehicle ahead. Therefore, careful marking of the route is necessary to prevent drivers from getting lost. If drivers operate independently, more detailed briefing is required, maintenance arrangements may be difficult, and arrangements for refueling and messing are complicated. Since individual vehicles and small units operate separately and since other units may be moving simultaneously over the same route, there is danger that vehicles may become bunched, thus preventing dispersion. Because of the minimum control, the tactical employment of a unit moved by infiltration

may be difficult or impossible until the movement is completed.

12. March Discipline

a. The responsibility for good march discipline begins with the driver. The driver of each vehicle is responsible for observing the proper distance and speed, for safety precautions, for performance of prescribed at-halt maintenance, and for strict compliance with standing operating procedures and specific orders governing the march. The driver is given adequate orientation on routing and destination to insure his safe arrival if he becomes separated from the column. When time and facilities permit, he should be supplied with a strip map of his route.

b. The assistant driver should be constantly on the alert for column signals and warnings and for signs placed along the route. He alerts or warns the driver and transmits information back along the column when appropriate. This is particularly important at night or under conditions of poor visibility. The assistant driver should assist the driver in every way possible. This includes guarding against his falling asleep, assisting in at-halt maintenance services, and helping with emergency repairs.

c. Squad leaders supervise the actions of the drivers of vehicles assigned to their squads, giving particular attention to spacing of vehicles and the performance of first echelon maintenance.

d. Section leaders and platoon leaders supervise the actions of squad leaders, giving them the instructions required for the proper functioning of their sections or platoons.

e. The march unit leader or commander gives orders to move or halt and exercises general supervision over the conduct of his unit. He is responsible for maintaining the proper position of the march unit within a larger column and for carrying out the orders of the column commander.

f. Commanders in a convoy, column, or serial are responsible for their units. This responsibility becomes broader and more general at each higher level of command.

13. Start Point (SP)

a. A start point is a well-defined point on a route at which a movement of vehicles begins to be under the control of the commander of the movement. It is at this point that the column is formed by the successive passing, at the appointed time, of each of the elements composing the column. In addition to the principal start point of a column, there may be secondary start points for its different elements (STANAG 2154, app II).

b. The start point should be so located and the movement so scheduled that the vehicles of the movement will be traveling at the speed and with the intervehicular gap specified for the movement when arriving at and passing the start point. Movements should not be halted at the start point.

c. Scheduling of the movement is based on the start point. Necessary adjustments to compensate for unforeseen delays or changes are made at this point and, on dispatch routes, the start point is used as the position to check various convoys onto the route. The vehicle odometer reading at the start point is recorded so that points along the route may be identified in terms of mileage from the start point.

14. Halts

Halts are made for purposes of rest, personal comfort and relief, messing, refueling, maintenance and inspection of equipment, allowing other traffic to pass, and adjustment of operational schedules. The time and duration of halts are usually prescribed in orders from radio silence or if intracolumn communication is inadequate. A halt of 15 minutes may be made at the end of the first hour; thereafter, halts of 10 minutes are normally made after each 2 hours of running time. Under conditions of extreme cold on marches of more than 4 hours, halts should be made every hour. Mess and refueling halts are generally $\frac{1}{2}$ to 1 hour. When there is a requirement to permit others to pass, a mess and refueling halt should be scheduled to coincide with the passing, thus utilizing necessary delay to advantage. To maintain proper gaps between serials, it is desirable that all elements halt at the same time. In implementation of this principle,

STANAG 2154 states that all columns following the same itinerary will stop at the same time, following orders given by the authority responsible for the regulation of traffic in the area.

a. The locations for scheduled halts should be selected in advance, specifically ordered, and plotted on road movement graphs. These selections may be prescribed by higher authority, made tentatively by map reference, or made by the reconnaissance party. On dispatch routes, rest halt areas or highway regulation points (FM 55-9) may include facilities for messing, refueling, and maintenance if warranted by the situation.

- (1) If the halt is brief and will not interfere with normal traffic flow, the column may stop on the shoulder of the road. It is desirable that halting places provide turnaround facilities or circuitous exits so that the column can be reversed quickly or can reenter the route conveniently.
 - (2) Subordinate commanders should require vehicles to stop a safe distance from crossroads, railroad crossings, or similar danger points within the halt area of the column. No part of a column should stop on bridges, and halts on sharp curves and steep grades should be avoided.
 - (3) The comfort of personnel and servicing facilities for vehicles are important considerations in selecting sites for long halts. If a column starts from a populous area, its first halt should be delayed, if practicable until a rural area is reached. Halts should not be made in villages or towns unless there is a special need.
- b. Some precautions to be observed follow:
- (1) Columns should be halted at points providing a clear view of at least 200 yards (183 meters) to both front and rear. If conditions prevent this, measures must be provided to forewarn approaching traffic.
 - (2) Guards, warning flags, caution lights, or flares (within limits of security)

should be posted at the front and rear of the halted column and at any other points where there is a hazard to passing traffic. If the column blocks part of the road at the halt so that it is necessary to operate one-way traffic, authorized traffic movements in both directions may be alternated either by using flags transmitted from one end of the single lane to the other by the last vehicle of each passing group or by posting guards to control traffic by signal.

- (3) When the halted column forces traffic moving in the same direction to cross the centerline, vehicles should be parked with enough distance between them to allow passing vehicles to enter the column upon the approach of vehicles from the opposite direction.
- (4) All personnel other than traffic guides must remain off the road to the right of their assigned vehicles, keeping the traveled portion of the road clear at all times.

c. To maintain traffic flow that takes maximum advantage of the road capacity of a route, provision is made for the safe passing of columns by individual vehicles or other columns under certain conditions as indicated in paragraphs 35 and 36 of STANAG 2154 (app II).

d. At halts, officers and noncommissioned officers check the welfare of personnel, the security of loads, and the performance of at-halt vehicle maintenance. Control personnel make necessary inspections and give instructions to insure prompt resumption of the movement with a minimum of confusion at the end of the halt. Mess, medical, and maintenance personnel perform such special duties as the purpose and duration of the halt permit.

15. Accident Procedures

The following accident procedures are those normally required, regardless of the location or circumstances. They may be followed in the case of damage or casualties resulting from enemy action as well as those caused by care-

lessness. However, modification may be necessary to meet certain situations.

a. *Column Continues March.* The main part of the column does not stop to render assistance. Every effort is made to clear the route and to continue the march. However, a serious accident may block part of a convoy or require a convoy to be temporarily halted. Such halts should be made far enough from the scene of the accident to prevent further congestion and mishap.

b. *Trail Gives Assistance.* Vehicles to the rear pull around the accident. If the accident blocks the route, personnel in vehicles to the rear assist in clearing the route and proceed with the march as soon as a passage is cleared. Immediate assistance is required for injured personnel and is rendered by personnel of the following vehicle. The first officer or noncommissioned officer to arrive at the scene takes charge, rendering emergency aid and directing traffic until the trail officer, medical officer, or other competent assistance arrives. Care of the injured, salvage or disposition of vehicles, and clearance of the route are normally under the direction of the trail officer, aided by medical and maintenance personnel.

c. *Precautions Against Further Accidents.*

- (1) After a motor vehicle accident, the vehicle or vehicles involved are frequently in dangerous locations and a crowd may collect in the road. This situation may cause another accident, perhaps more serious than the first. Immediate action must be taken to warn traffic to proceed with caution. Guards, flares, lights, or flags may be posted as indicated by the situation. Civil or military police, if present, direct and control traffic; otherwise, personnel should be detailed from the column for this purpose.
- (2) Traffic control personnel restore normal traffic movement as soon as possible. Damaged vehicles, if not blocking important traffic, are left undisturbed to assist in determining the cause of the accident. In certain states and countries, it is illegal for anyone except the police to move ve-

hicles involved in accidents except to rescue personnel. Military personnel must be familiar with local laws and regulations. Witnesses should remain at the scene of the accident to provide information for the investigating officer if the military situation permits.

d. Aid to the Injured. Basic first aid may be rendered by those first arriving on the scene of the accident. However, it is important not to move apparently seriously injured persons unnecessarily, and competent medical personnel should be summoned immediately. In cases where there is danger from fire or explosion, the injured must be moved to safety without delay, regardless of the absence of medical personnel.

e. Precautions Against Fire. In all motor vehicle accidents, there is danger of fire because of gasoline leakage. To reduce this danger, engines should be cut off immediately and smoking and open flames should be prohibited near the wreck.

f. Notifying Authorities.

- (1) Normally, all accidents that result in injury to an individual or animal or in damage to property are reported to the column commander or designated staff officer without delay and to the military police of the nearest military installation.
- (2) Most civil governments require that police be summoned in cases of motor vehicle accidents. The Army cooperates with civil authorities in the

United States and friendly countries in such matters. If civil police are not present, they should be notified.

- (3) Accident investigation agencies are summoned in accordance with current instructions. Policies on the investigation of accidents may be modified by the tactical situation, the area standing operating procedure, or applicable agreements between military and civil authorities. For further information, see FM 19-25.

16. Release Point (RP)

A release point is a clearly defined point on a route at which specified elements of a column or convoy of vehicles revert to the control of their respective commanders. In addition to the principal release point of a column, there may be secondary release points for the various elements (STANAG 2154, app II). Although release points are generally considered to be located at or near the end of a route, they may be established at any point along an established convoy route where vehicles will leave the route. Release points should be so located that vehicles leaving the established convoy route have easy access to existing road nets and may clear the convoy route without delay or congestion. Where applicable, reconnaissance and organization of the area, allocation of areas to specific elements, selection and preparation of routes, and posting of guides or signing of roads must be made before arrival of the column or convoy.

CHAPTER 4

MOVEMENT OF PERSONNEL

17. General

a. Since it is normally desirable that troop units be kept together and that their supplies and equipment move with them, motor columns transporting personnel are often larger than supply convoys, which may more readily operate as small march units or serials. However, for control purposes, columns of a troop movement are easily separated into march units corresponding to the smaller units making up the troop organization.

b. Two units—the unit being transported and the truck unit furnishing the transportation—are frequently involved. It is essential that the functions and restrictions applicable to each unit be clearly delineated and that command responsibilities for the conduct of the movement be understood and observed.

18. Command

a. Personnel movements by motor vehicle include those made in vehicles organic to the unit being transported, those made in vehicles of truck units assigned or attached in direct support of the unit being transported, and those made by truck units operating as a part of the general hauling service provided by the highway transport service in direct support of the unit being transported.

- (1) When a unit is being transported in its organic vehicles, the troop commander has full command of both the personnel being transported and those operating the vehicles.
- (2) The commanding officer of a unit to which a truck unit has been assigned or attached by proper authority exercises command over the truck unit through its commanding officer.
- (3) When a truck unit is not assigned or attached to the unit that it is trans-

porting but is providing the direct support required, command of the convoy and of each serial or march unit remains with the truck unit commander and his representatives at their respective levels. In this case, the commanding officer of the troops being transported (troop commander) retains full command of his troops and issues any orders necessary to conform to and implement those issued by the convoy commander concerning schedules, march discipline, and operation of the convoy. When combat troops are being transported and a tactical emergency arises, the commander of troops being transported, regardless of rank, assumes command of the convoy and issues such orders as may be necessary to meet the emergency.

- (4) Since tactical movements are, in general, movements to contact and since the success of the operation may be dependent upon the rapid and efficient tactical deployment of troops, the commander of combat troops commands the tactical movement regardless of whether it is made in organic vehicles or in direct support vehicles. If a transportation unit is supporting the operation, the commander of this unit acts as a subordinate commander and transportation adviser to the tactical commander.

b. The senior officer or noncommissioned officer of the troops in each truck commands the personnel transported in that truck. He is responsible for their discipline and for their compliance with existing convoy regulations and other standing operating procedures. The driver of the vehicle, or the senior officer or

noncommissioned officer of the operating personnel, is responsible for compliance with the operating instructions. He is responsible for safe operation of the vehicle and is required to insure that personnel being transported observe safety, sanitary, and other regulations. The driver insures that the senior officer or noncommissioned officer of troops is familiar with applicable safety instructions. The senior officer of troops does not interfere with the proper operation of the vehicle. He complies with all suitable instructions of the operating personnel, but it is his duty to take immediate corrective action in any case of dereliction on the part of operating personnel, and to report it to the appropriate superior. At the lower levels of command, these principles apply whether the movement is by organic vehicles or direct support truck units. In each case, prescribed personnel are charged with responsibility for the movement. They operate under definite plans, and officers and noncommissioned officers of troops being transported comply with the orders issued under those plans.

c. In individually dispatched vehicles, the senior passenger is responsible for seeing that the driver obeys laws, regulations, and instructions.

19. Methods of Movement

There are four methods by which personnel may be transported by motor transport:

a. *Full Lift*. When sufficient truck units are available or when the troop unit is completely motorized, the entire movement may be accomplished in one lift.

b. *Point-to-Point Shuttle*. If sufficient vehicles are not available to accomplish movement of a unit in one lift, truck units may shuttle back and forth from point to point, taking a portion of the troops on each trip until the movement is complete. This method is not recommended in tactical movements when additional transportation is available from higher headquarters.

c. *Leapfrog Shuttle*. Leapfrog shuttle is perhaps best adaptable to tactical troops making advance or retrograde movements in combat or in close support of combat operations. This method may be illustrated by the movement of

two units of a single command. From one position, a unit moves, establishes, and holds another position. When this position has been established, the vehicles return for the other unit. Instead of taking these troops to the position established by the first unit, the vehicles carry them past, where they establish a third position. Then the vehicles return to the first unit and carry it past the position established by the second. This operation is repeated until the troops arrive at their final destination. This method allows the movement to continue while adequate positions are maintained.

d. *Part-Ride, Part-Walk Shuttle*. In a part-ride, part-walk shuttle, a limited number of vehicles are used to speed the continuous forward movement of foot troops. A part of the unit entrucks at the start of the march and is carried to a selected point along the route where troops dismount and move to destination on foot. The trucks return for the balance of the unit, which, meanwhile, has started the march on foot; these marching troops are then entrucked and transported to final destination. This method enables all elements of the unit to arrive at the destination at the same time, each having performed an equal portion of the march on foot.

20. Entrucking Procedure

Entrucking is the process of loading personnel into motor vehicles preparatory to movement by motor transport.

a. An entrucking point is selected that requires minimum marching by foot troops and minimum movement of supplies and equipment, that affords adequate space for entrucking, that presents no undue obstacles to the movement of vehicles, and that offers ready access to the selected route of march. There are many methods of entrucking, but only two are described here to illustrate possible methods.

- (1) When there is sufficient time for planning the move and for prepositioning troops, the following is a good method. The troop commander ascertains the makeup of the motor column that will transport his unit, the capacity of each vehicle, and the gaps between

vehicles as they halt for entrucking. He then divides his command into groups corresponding to the location and capacity of the vehicles. At the prescribed hour, the troop commander forms his unit along the line of march of the vehicles, with intervals between groups corresponding to the gaps between vehicles at the halt. On command, all troops mount their assigned vehicles simultaneously. This is the quickest method of entrucking, but it requires careful planning and adequate space for trucks and troops.

- (2) When time and space are not adequate for the method of entrucking as described in (1) above, the trucks may be parked and the troops marched alongside in single file or in columns of twos or threes and counted off into vehicle groups.
- (3) A combination of the two methods may be used for general troop loadings by assigning each section, platoon, or company to a selected number of trucks. Upon command, all units are marched simultaneously alongside their assigned trucks. Each platoon or section leader counts off his men into groups as they mount the assigned vehicles.

b. The driver of each vehicle is responsible for unfastening the safety strap and lowering the tailgate before personnel are permitted to mount the vehicle. After all personnel have mounted, the driver closes and secures the tailgate and fastens the safety strap.

21. Tactical Loading

Loading for a tactical motor movement is normally done in the manner best suited to the speedy employment of troops according to their normal methods of combat. Full use of transport space is subordinated to tactical considerations. However, techniques and procedures of entrucking and detrucking used in administrative movements may be modified to fit the tactical situation. Adequate security must be provided since troops are particularly vulnerable in entrucking and detrucking areas. Security must include cover and concealment,

dispersion in conformity with tactical considerations, and the highest standards of troop discipline to meet requirements for defense against nuclear weapons.

a. Packs, other than combat packs, are not normally worn in military vehicles. They should be stacked on the floor between or under the seats.

b. Duffel bags are normally loaded in trailers towed by the vehicle transporting the personnel, but they may be loaded on vehicles with the men to whom they belong. The latter procedure reduces the number of men who may occupy the vehicle with comfort but lessens the probability of loss of equipment.

c. Individual arms should remain with the individual soldier. However, troop commanders must instruct their troops in the proper manner of entrucking with arms in order to eliminate the possibility of accidents. Each man should board a vehicle without his weapon. This can be accomplished by having each individual either pass his weapon into the vehicle before boarding or pass his weapon to another individual on the ground and retrieve it after boarding. The vehicle driver may assist in this procedure.

d. All items of individual equipment not needed on the march may be loaded in separate trucks or trailers by troops detailed for this purpose.

22. Detrucking Procedure

Detrucking is the unloading or dismounting of personnel from motor vehicles after completion of a move by motor transport.

a. Normal detrucking should provide for the reassembly of units, prompt unloading of troops and equipment, clearing of unloading areas, and staging and reuniting of troops and their equipment. Except in an emergency, the order to detruck should not be given by the commander until drivers have lowered tailgates. This decreases the possibility of injuries. Possible methods of detrucking follow:

- (1) When the area is suitable, the column may be halted in close formation and all troops detrucked simultaneously. This method is quick but may require troops in the rear to march the

length of the column to assemble or to reach their destination.

- (2) Successive trucks, truck squads, truck sections, or platoons may pull up to a designated point at which the troops detruck and assemble.
- (3) When troops are going into billets or bivouac, a dispersal point may be designated from which guides conduct sections of the truck column to the vicinity of the billets or bivouac where the troops detruck with their equipment.

b. *Emergency detrucking practice* should be included in the training of troops since the speed and safety with which troops can leave their vehicles and be prepared for action may be a deciding factor if the enemy attacks. Emergency detrucking, which may require jumping over the side of a vehicle, may cause sprained or broken ankles or other injuries. However, men trained in the proper techniques of emergency detrucking can dismount quickly with their weapons ready for use with little danger of injury.

c. In normal detrucking, troops should not be permitted to dismount until vehicles have come to a full stop—and then only upon the command or signal of the commander or his authorized representative.

23. Reconnaissance and Security

Reconnaissance and security are vital to any tactical movement of troops. Timely and accurate information of the enemy and the terrain is of primary interest to the commander in making his decisions as to movement and formation of his command. Security elements assure the continued advance of the command, protect it from surprise ground attack, deny observation by the enemy, and give warning in case of air attack. Reconnaissance and security measures may include the following:

a. *Covering Force.* The covering force normally operates well forward of the main force with the mission of early development of the situation; crushing enemy resistance when possible; and deceiving, delaying, and disorganizing enemy forces until the main force can prepare for action. The covering force precedes the advance guard of the column and provides its own security.

b. *Advance Guard.* The advance guard has the mission to prevent delay of the main body and to protect it against surprise attack. Its size, composition, and disposition vary with the mission, terrain, and tactical situation.

c. *Flank Guards.* Flank guards cover routes of approach that might be used by hostile forces to attack the flanks of the column. The flank guards drive off harassing forces and give timely warning of the approach of larger enemy forces.

d. *Rear Guard.* The rear guard follows and protects the main body on the march, defeating or delaying hostile forces attacking from the rear, protecting the trains, and collecting stragglers.

e. *Defense from Air Attack.* Air guards are placed on all vehicles to warn of the approach of enemy aircraft. In addition to the security afforded by air guards, defense against air attack is achieved by continuous manning of weapons, dispersion, and maintenance of proper distances.

f. *Communication Security.* Communication security, normally prescribed in standing signal instruction (SSI), insures adequate protection against enemy communication intelligence activities such as radio interception, position finding, traffic analysis, and cryptanalysis.

g. *Army Aviation.* Army aviation when available, may be used in reconnaissance, selection of alternate routes, movement of security forces, and highway regulation and control.

CHAPTER 5

SERVICE SUPPORT MOVEMENTS

24. Distinctive Characteristics

Service support movements include the necessary movement of all elements engaged in supply, evacuation, maintenance, and administration of a combat force. Such movements may be made by organic vehicles of the service element of a command under organizational control, by assigned or attached units, or by truck units operating under centralized transportation movements commitment procedures. The majority of traffic involved in service support movements will be carrying supplies. Traffic with the primary mission of evacuation, maintenance, or administration is seldom organized and may generally be considered as casual traffic under area control.

a. Supply movements in forward areas are generally accomplished by motor transport units. Supply convoy personnel and equipment may be utilized to provide reconnaissance and security for the convoy. However, this capability is limited, and its use will reduce the unit's ability to accomplish its mission. When supply convoys require substantial reconnaissance and security, these functions may be performed by troops assigned to the convoy organization for that specific purpose. Passive security measures, including use of cover and concealment and camouflage discipline, are taken as appropriate.

b. Supply convoys should be of a size and formation that assure most effective traffic flow over the routes involved. Experience indicates that, in the operation of supply convoys, the best results are obtained with small groups of vehicles. Therefore, march units of a supply movement should not normally exceed one truck platoon and serials should not exceed one truck company. Small serials require more staff planning and involve more work in recording the progress of the movement, but more detailed information is possible concern-

ing their progress, closer supervision may be exercised, and orders may be changed more easily.

25. Classes of Operation

Military motor transportation may be employed in various ways to accomplish specific transportation missions. These operations may be classified by either the type of haul or the task assigned.

a. Hauls may be described as local or short hauls and line or long hauls. Local hauls are characterized by short running time in relation to loading and unloading time. They normally involve a number of trips per day and are evaluated on the basis of tons moved during the operational period. Line hauls are characterized by high running time in relation to loading and unloading time. They normally involve one trip or a portion of a trip per day and are evaluated on the basis of time consumed, distance traveled, and tonnage hauled during the operational period. This may be expressed in ton-miles forward.

b. Tasks in which motor transport is employed are as follows:

- (1) Water terminal (port and beach) clearance (para 28).
- (2) Truck terminal operations (para 29).
- (3) Installation support operations (para 30).
- (4) Transfer operations (para 31).
- (5) Combat support operations (para 32).
- (6) Combat service support operations (para 33).

26. Methods of Operation

There are three general methods employed in hauling supplies by highway. These are classified as direct haul, shuttle, and relay.

a. *Direct Haul.* A direct haul accomplishes

a single transport mission in one trip and involves no transfer of supplies or exchange of equipment. It is normally limited to local hauls during the initial stages of an operation before transfer or exchange points have been set up and when it may be desirable to expedite forward movements. In line haul operations, direct hauls of extended duration greatly tax drivers and equipment and often result in loss of control by the unit.

b. Shuttle. The simple shuttle is accomplished by means of repeated trips made by the same vehicles between two specified points.

c. Relay. Relay hauling is the continuous movement of supplies or troops over successive segments of a route without transfer of load. It is accomplished by change of drivers, powered vehicles (tractors), or both, for each segment. This method is most commonly employed in long hauls. The relay system, employing tractor-semitrailer combinations, is the most efficient method of line haul motor transport operation in areas with a well-developed road network not subject to hostile interference and when a one-way haul cannot be completed in one day. Unitization of cargo increases the effectiveness of this system and exploits the capacities and tonnage capabilities of the task equipment. In addition to rapid through movement of loads, the system provides command supervision and supporting services for segments of the route. (For detailed discussion of relay operation, see paragraph 40.)

27. Combined Operations

Motor transport may be combined with other modes—rail, water, and air—to reduce the handling of cargo and, thus, the time en route from origin to destination.

a. Piggyback or Trailer on Flatcar. This is the term given to the combination of rail and motor transport. Semitrailers are loaded and sealed at the point of origin, placed on rail cars, and moved forward as far as possible. At this point they are off-loaded, coupled to suitable towing vehicles, and delivered to their destinations over the highway.

b. Roll-on, Roll-off. This is the term given to the combination of water and motor trans-

port. Loaded semitrailers are towed aboard specially constructed vessels at the port of embarkation and transported to an overseas port. There they are coupled to towing vehicles while still aboard ship and are then moved by highway to their destinations.

c. Lift-on, Lift-off. In a lift-on, lift-off operation, loaded trailers are moved to port, uncoupled from their prime movers and loaded aboard ship. Upon arrival at an overseas area, these trailers are off-loaded and moved to destination by highway.

d. Air. With the increased use of air transport for both tactical and strategic mobility of troops and supplies and the concurrent development of aircraft of greater capacity, the movement by air of motor vehicles loaded with high-priority cargo has become possible, thus allowing immediate distribution of these critical supplies on landing.

28. Water Terminal (Port and Beach) Clearance

Water terminals utilized by overseas commands may be major commercial ports, or they may be small ports and beaches. Terminal clearance is a major factor in successful terminal operation. Movement of cargo away from the terminal is most important during periods of peak operation. A transportation terminal command supervises terminal clearance; its operations section is responsible for consolidating all requests for water terminal clearance. A motor transportation officer assists in planning and coordinating the use of motor transportation in support of the terminal command for terminal clearance. He assists in planning and setting up the circulation net and regulates the flow of vehicles throughout the terminal area. Terminal clearance, as it pertains to motor transport operations, is the clearing of cargo from the immediate vicinity of the port or beach area to permit continuous unloading of ships otherwise hampered by backlogs of supplies within the area.

a. Beach Clearance. Beach clearance operations are characterized by the necessity to utilize poor roads and temporary facilities and by the need to move cargo from discharge points with minimum delay to prevent congestion on

the beach. Effective control is essential to success in operations of this type. The establishment of efficient truck parks for rapid assignment and dispatch of task vehicles, provision of adequate communications, and careful planning of traffic circulation to give maximum use of access and exit routes promote effective control and smooth, rapid clearance.

- (1) A truck park is a central receiving and dispatching point established to control and route motor vehicles. It may be set up in addition to the regular company motor parks and dispatching points and lacks the maintenance, storage, and refueling facilities normally found in a motor park. The port truck park is provided at a centrally located point to receive and dispatch vehicles individually or in small groups. This reduces delays in loading; permits consolidation of supplies of the same class; and allows trucks to carry cargo to forward supply points, unload, and return to the beach without interruption.
- (2) A traffic circulation plan for the area must be made, and adequate signs and markers must be provided. The traffic circulation plan is the responsibility of the appropriate transportation officer.
- (3) The types of vehicles used in a beach clearance operation may determine the success of the mission. Selection depends upon the trafficability of the beach and immediate area and upon the availability of suitable vehicles. In general, those vehicles with highest flotation have primary consideration. Light cargo trucks are normally most suitable for beach clearance operations. Flotation may be improved by reducing tire pressures. Routes over the beach may be reinforced by steel landing mats and other devices. Under average conditions, it is seldom advisable to use tractor-semitrailer combinations in beach clearance operations.

b. Port Clearance. Motor transport clear-

ance operations in the vicinity of an established port are normally facilitated by improved access routes and permanent facilities for administration, communications, and control. However, these advantages may be offset by the increased tonnages involved and the intricate traffic patterns common to port areas. Control of highway operations is maintained by using the truck park and control points as described for beach clearance. The use of control and information charts is recommended.

29. Truck Terminal Operations

Truck terminal operations involve the establishment and operation of truck terminals in conjunction with line haul or relay operations, including provisions for assembly and dispatch of motor transport equipment, maintenance and servicing of equipment, and such other facilities as may be required. (For a detailed discussion of truck terminal operations, see paragraph 41.)

30. Installation Support Operations

a. Administrative Operations. Transportation truck and car companies may be given the mission of providing transportation for headquarters and installations that do not have sufficient transportation to meet their requirements. Tasks not included in line or local hauls may be classed as administrative or utility operations. These operations include messenger service, ration deliveries, casual movement of personnel, support to local construction activities, and other demands for motor transportation. Normally, motor pools are established for these operations and vehicles are dispatched on a mission basis.

- (1) In a theater of operations, especially within sections of the communications zone, there is a great demand for motor transportation in the administration and operation of depots. Requirements are constantly changing for local movement of cargo and for rewarehousing of supplies not needed for immediate use. In addition, major construction efforts at these installations often require truck support for units engaged in construction.

- (2) The depot commander is responsible for the employment of vehicles engaged in operations within the depot. Use of roving patrols of the motor transport service to check the situation at the various depots is a primary means of insuring effective control and utilization of vehicles. Transportation movements personnel may assist in planning vehicle utilization. In operations requiring much transportation, a representative of the parent transportation unit may be detailed to supervise the use of vehicles. The senior officer or noncommissioned officer of the transportation unit or detachment is responsible for the vehicles of his command.
- (3) Intradepot operations normally require frequent movement of small loads to a number of destinations. Utility vehicles and light trucks are most suitable; the selection of vehicles for specific missions is based on maximum utilization of cargo space and carrying capacity.

31. Transfer Operations

a. Transfer operations are conducted by means of transfer points which are established where conditions require transfer of cargo from one mode or unit of transportation to another. Motor transport units, because of their mobility and flexibility, are most often employed to transport cargo from the transfer point to destination. These units may have the additional responsibility of setting up and operating the transfer points. They may be assisted by assigned or attached transportation terminal transfer units or detachments when trained personnel are responsible for the unloading of cargo from incoming carriers, the operation of temporary holding areas, and the loading of cargo for forward movement. The transfer point commander and the senior officer or noncommissioned officer of the terminal transfer unit select and plan the use of areas and facilities to expedite the continuous forward movement of cargo. The terminal transfer unit commander acts in the capacity of a special staff officer to the transfer point

commander. Operations and required facilities for motor transport service at the transfer point are similar to those of the truck terminal (paras 29 and 41).

b. Transfer points include railheads, navigation heads, truckheads, pipeheads, and air terminals.

32. Combat Support Operations

Motor transport units may be employed in direct support of tactical operations. Armies, corps, or divisions may use organic or attached motor transport as a pooled service to be allocated where and when needed to meet the current situation. Motor transport missions in combat support include, but are not limited to, transporting supplies and equipment to combat units; moving troops to attack or counter-attack positions; and providing essential mobility for headquarters, for nonmobile equipment, and for supplies. Combat support motor transport units should be equipped with task vehicles having mobility comparable to the tactical vehicles of the supported unit.

33. Combat Service Support Operations

a. The majority of missions assigned to transportation motor transport units under current concepts are in combat service support operations. The transportation intersectional service is organized to serve the theater as a whole, providing necessary flexibility diversion, concentration, and allocation of transportation to rapidly reflect changes in the strategic and tactical situation. This organization contributes to economy of operation through centralization of control. The transportation intersectional service retains operational control of its operating motor transport units to their most forward point of delivery. Combat service support operations include the following:

- (1) *Depot-to-depot.* Depot-to-depot operations involve movement between depots within a communications zone or from depots in the communications zone to depots in the field army area. When the requirement is regular and sufficient tonnage is involved, a transportation motor transport unit may

be assigned to depot-to-depot transport mission. Otherwise, vehicles are dispatched daily by number and type to meet specific requirements.

- (2) *Depot-to-army supply point.* Movement of supplies to army supply points is normally accomplished from depots in the communications zone.

Substantial transportation economy is achieved by throughput of supplies directly from communications zone depots to army supply points and, where feasible, direct to users.

- b. For a detailed discussion of the transportation intersectional service, see chapter 6.

CHAPTER 6

TRANSPORTATION INTERSECTIONAL MOTOR TRANSPORT SERVICE

34. General

a. Transportation intersectional motor transport operations are normally line-haul movements operated for extended distances over main supply routes. They may extend through the communications zone into the army service area. Line hauls may assume the proportions of a major logistical task in support of a field or other large unit and become the assigned mission of a motor transport command. Line hauls may be operated with such precision that tonnage can be hauled at a predetermined rate. Additional transportation economy can be gained when requirements for tonnage can be made routine and regular operations established. Policies for intersectional line hauls are determined by the theater army logistical command (TALOG).

b. At times, motor transport express operations may be required. Express operations are expedited movements of high-priority cargo in which established line-haul procedures are modified in the interest of a more rapid delivery than regular line haul. Scheduling must be precise and control highly centralized. Express operations may be given the specific mission of supporting a field army or other large unit or of moving a designated tonnage or type of supply within a specified period of time. Express operations may be established whenever there is a necessity for expeditious movement of tonnage over considerable distances and when other modes of transportation cannot meet the requirement.

35. Command

The commander of a motor transport unit is responsible for operation of the line haul. Depending upon the size of the operation, a battalion or group headquarters may be used. In a large-scale operation requiring units from three or more motor transport groups, a motor

transport command may be assigned this mission.

36. Organization

a. The precise organization for a line haul depends largely on the distance involved, the tonnage to be moved, and the type of cargo to be transported. These factors affect the number, type, and composition of the units assigned. Over long distances, a motor transport command may be the highest headquarters and group or battalion headquarters may be assigned responsibility for operation of truck terminals and specific segments of the route. Over short distances, the group or battalion headquarters may operate the entire route.

b. Attachment of truck companies and other units to command units of the motor transport service is made according to unit capabilities, the geographical area, and time and distance factors of the route.

37. Equipment

Tractor-trailer equipment is ordinarily the most efficient equipment for line hauls. Medium truck companies should serve as the nucleus around which the operation is established. Heavy-lift equipment contained in the heavy truck company can be used for line hauls of heavy and outsized equipment.

38. Operational Planning

a. When operational plans are made for a line haul, the following factors must be considered:

- (1) Capabilities of the routes to be employed.
- (2) Feasible maximum speeds to be allowed over various segments of the route.
- (3) Current personnel and vehicular strengths of assigned truck units.

- (4) Specific locations for units, truck terminals, and trailer transfer points.
- (5) Specific amounts and types of tonnages to be transported, locations of depots and supply points for cargo pickup and delivery, and capabilities of equipment and units to perform the required tasks.
- (6) Definite requirements for any supporting services, such as POL service, maintenance, and communications.

b. In addition, the operational planner must develop the road movement graph, convoy schedules, route maps, and support plan for the operation.

c. Programed movement requirements are allocated to each transport mode through the command movement program, which is distributed to all interested agencies. This allocation is expressed as an average daily short-ton requirement by class and service of supply. The mode planner must translate these bulk allocations into anticipated equipment requirements and adjust his capabilities to insure the accomplishment of the programed requirements. However, the program is not self-implementing. Shippers must initiate a request for movement through the transportation movements field organization in advance of the shipping date as prescribed by command standing operating procedure. If daily requirements exceed available truck capacity, adjustments are made by the transportation movements organization according to established priorities. Information concerning actual or anticipated shipments is teletyped to motor transport headquarters and to intermediate and destination truck terminals. This permits prior planning for all agencies.

d. This standard procedure may be varied when shipping installations are overburdened or priority is given to personnel movements or to specific classes of supplies.

- (1) If shippers are unable to fulfill commitments, they inform their own special staff section and the local transportation movements officers of anticipated difficulties. Corrective action is taken at TALOG headquar-

ters. Shipping may be allocated to different shippers, or additional loading capability may be given to shippers. Motor transport headquarters is informed of the decision and informs the origin truck terminal of the plans. Since this terminal has integrated dispatch facilities, trucks engaged in shuttle operations can be quickly shifted to new pickup points. The same system is used at destination points.

- (2) In an emergency, in-transit storage may be required at origin or destination terminals, at intermediate terminals, or at trailer transfer points. However, in-transit storage is discouraged as it lessens the capability and flexibility of motor transport equipment. Motor transport command headquarters keeps the TALOG transportation officer informed of the class and quantity of supplies stored in transit and the quantity and type of transport equipment inactive because of mobile storage. Since the ratio of shuttle vehicle to line haul equipment is carefully proportioned, mobile storage can disrupt the operation. Continuation of storage without a proportionate decrease in tonnage allocation necessitates additional transport equipment if allocated tonnage is to be delivered.
- (3) Changes in supply movement programs are relayed to subordinate command units by motor transport headquarters. Action is taken by all units to adjust operations to the changing situation.
- (4) Large personnel movements are expedited. If motor transport units in addition to those assigned are used, motor transport headquarters is responsible for integrating the move over the roadway. Priorities are established for personnel convoys and are coordinated at truck terminals and highway regulation points.

e. For additional planning procedures, see chapter 7 and tables V-XIV in chapter 8.

39. Route Selection and Reconnaissance

a. Routes selected for motor transport line-haul operations should, if possible, be primary-type paved highways with good connecting and access roads. If a two-way route is not available, parallel one-way routes with regular points of convergence should be selected. The points of convergence should coincide with the desired locations of truck terminals or trailer transfer points.

b. A complete and detailed analysis of the route must be made from available information or from maps and aerial photographs; if practicable, a ground reconnaissance should be conducted. The analysis should include the location of critical points, bottlenecks, and hazards; a full evaluation of the traffic potential; and estimates of average speeds over every segment and of approximate time distances between trailer transfer points. When a ground reconnaissance is made, the following information will be obtained: average traveltime; desired speeds; ability of vehicles to negotiate difficult grades, defiles, bridges, or terrain; and initial repairs required in roadway or structures before operation.

c. As a result of this analysis, the route can be segmented to provide approximately equal time distances between trailer transfer points or terminals. Routings and regulations to be established for vehicular movements over various segments are determined. The location of depots, supply points, transfer points, and supporting facilities must be considered. The method of operation and the schedule of movement have a definite bearing on all these factors.

40. Methods of Operations

The equipment available, the road conditions, and the logistical mission or military situation governing line hauls may vary in each situation. Since line-haul operations may be adapted in many ways to suit particular operations, successful operations depend in a large measure on the ingenuity and initiative of individual commanders and on the ability of planning staffs to foresee needs and to provide the types of equipment required. The

semitrailer relay method is normally used in line-haul operations.

a. A simple relay operation is established with a truck terminal at origin and destination and, depending upon the distance involved, one or more trailer transfer points at intermediate sites along the route. At the origin terminal, shuttle (terminal) tractors move empty semitrailers from the terminal to surrounding depots and supply points for loading and return loaded semitrailers to the terminal where they are documented, assembled, and prepared for forward movement. Line tractors of the unit responsible for operation of the first segment of the journey pick up loaded semitrailers and move them forward to the first trailer transfer point. Here forward-moving loaded semitrailers are exchanged for empty or return-loaded semitrailers, which are then returned to the origin terminal for rehandling and subsequent forward movement. Line tractors of the unit assigned the mission of operating the second segment of the operation transport forward-moving semitrailers to the next trailer transfer point where similar exchanges are accomplished. The relay is continued until the forward-moving semitrailers arrive at the destination terminal. Shuttle tractors then move loaded semitrailers to ultimate destinations for unloading and return empty or return-loaded semitrailers to the terminal, where they are documented, assembled, and prepared for retrograde movement. Thus there is a continuous flow of loaded semitrailers moving from depots and supply points to forward areas and of empty or return-loaded semitrailers moving rearward for subsequent rehandling forward movement.

b. The relay system should be designed to provide the necessary command, supervision, and support services required by the operation. This may necessitate establishment of facilities for messing, vehicle service and repair, quartering, administrative support, and logistical services.

c. The accountability, control, and maintenance of semitrailer equipment employed in relay operations are discussed in detail in paragraphs 45 through 48.

41. Truck Terminals

a. *General.* Truck terminals (fig. 1) are normally located in or near centers of concentrated trucking activities at both extremities of a line-haul operation, where they form the connecting link between local hauls and the line-haul service. They constitute assembly points and dispatch centers for motor transport equipment employed in line-haul operations. Although they may be used for in-transit storage or freight sorting, this use should be held to an absolute minimum. Truck terminals may, depending upon the situation, be located at intermediate points along the route of a line-haul operation and function not only as terminals but also as trailer transfer points.

b. *Facilities at Terminals.* The truck termi-

nal is a consolidated facility, normally commanded and operated by a motor transport battalion. It includes a marshaling area and such other activities and services as are required to support the operation: normally a dispatch office, a consolidated mess for operational personnel, and consolidated maintenance and servicing facilities. Truck unit bivouacs or temporary quarters for drivers may also be located within or near terminal areas.

c. *Operation of Terminals.*

(1) For the purpose of assembling semi-trailers for further movement, truck terminals use tractor-semitrailer equipment to operate a shuttle service to surrounding depots or supply

1. LINE HAUL DISPATCH POINT
2. INCOMING TRAILER PARK AND INSPECTION AREA
3. POL AREA AND TRACTOR INSPECTION AREA
4. MAINTENANCE AREA
5. BIVOUAC AREA FOR TERMINAL PERSONNEL
6. LOCAL TRACTOR READY LINE
7. MESS AND ADMINISTRATIVE AREA
8. LOCAL HAUL DISPATCH POINT
9. LINE HAUL READY LINE
10. BIVOUAC AREA FOR LINE HAUL DRIVERS
11. MARSHALING YARD

LEGEND:

- ▲ LINE HAUL TRACTOR
- △ LOCAL TRACTOR
- LOADED TRAILER
- EMPTY TRAILER

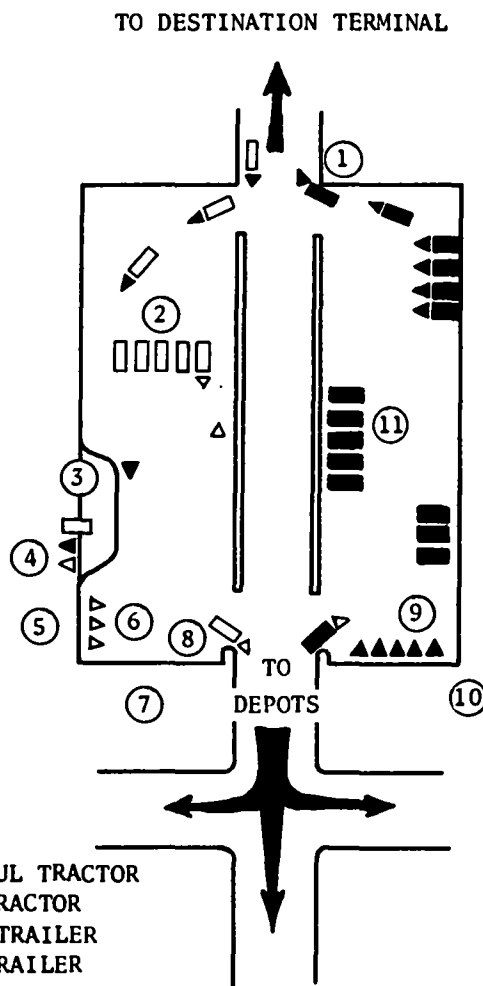


Figure 1. Truck terminal.

points, where the shuttle tractors exchange empty semitrailers for loaded ones. The loaded semitrailers are moved to the marshaling yard within the terminal, where they are spotted and prepared for further movement. Incoming line-haul tractors drop their semitrailers and, after required driver messing and vehicle servicing, are coupled onto loaded semitrailers for line-haul movement. At the destination terminal the process is reversed, incoming loaded equipment being exchanged for return-loaded equipment. Thus, by operating a shuttle service for local hauls and marshaling convoys in advance, delay to over-the-road tractors at either end of the line haul is reduced. This operation may also be carried out with straight trucks, but it then involves changing drivers or loading, unloading, or transferring cargo.

- (2) Every unit operating a truck terminal must keep a careful check on the location and use of its semitrailers, which are spotted at various depots and supply units awaiting loading or unloading. A close accounting of these vehicles is absolutely necessary, and the terminal commander must work out suitable receipting arrangements with the supply facility (paras 45-47).

42. Trailer Transfer Points

Trailer transfer points are normally located at predetermined locations along the route of a line-haul operation. They form the connecting links between those segments of a route designated as the areas of responsibility for various operating units, and they tie the overall operation into a continuous, efficient operation.

a. Minimum facilities required for operations are a dispatch point and a marshaling area to facilitate semitrailer interchange. Other facilities, such as a troop mess, a maintenance and service area, and a bivouac area, are established as warranted by the operational situation.

b. Basically, a trailer transfer point offers facilities for interchanging semitrailers between line tractors operating over adjoining segments of a line-haul route and for controlling and reporting upon equipment engaged in the operation. Line tractors arriving from rear areas drop their loaded semitrailers at a transfer point and pick up empty or return-loaded semitrailers for retrograde movement. Line tractors coming in from forward areas drop their empty or return-loaded semitrailers and couple onto forward-moving loaded semitrailers for further movement toward ultimate destinations. Local tractors may be employed within the trailer transfer point for shuttle operations to spot and prepare semitrailers for subsequent movement. This action reduces lay-over time of line tractors and expedites the overall operation.

c. Figure 2 illustrates a type express operation (line haul) incorporating origin and destination terminals and one trailer transfer point located at an intermediate point along the route of travel.

43. Highway Regulation and Other En Route Services

a. Line-haul operations require a closely supervised system of highway regulation and traffic control. Routes should be planned so that there will be as little interference as possible from other traffic. They should normally be reserved for express hauls or other priority movements cleared through the command having jurisdiction over the entire route. Routes must be well marked so that drivers can follow them easily.

a. Highway regulation points should be provided at convenient locations along the routes. Reports from highway regulation points enable the motor transport staff to maintain constant control of movements, to effect priorities, to make adjustments in routings, and to coordinate travel over the route in adapting operations to the ever-changing tactical situation. Highway regulation points may be established at communications zone sectional boundaries, truck terminals, trailer transfer points, and any other point as required. See FM 55-9 for detailed information concerning highway regulation.

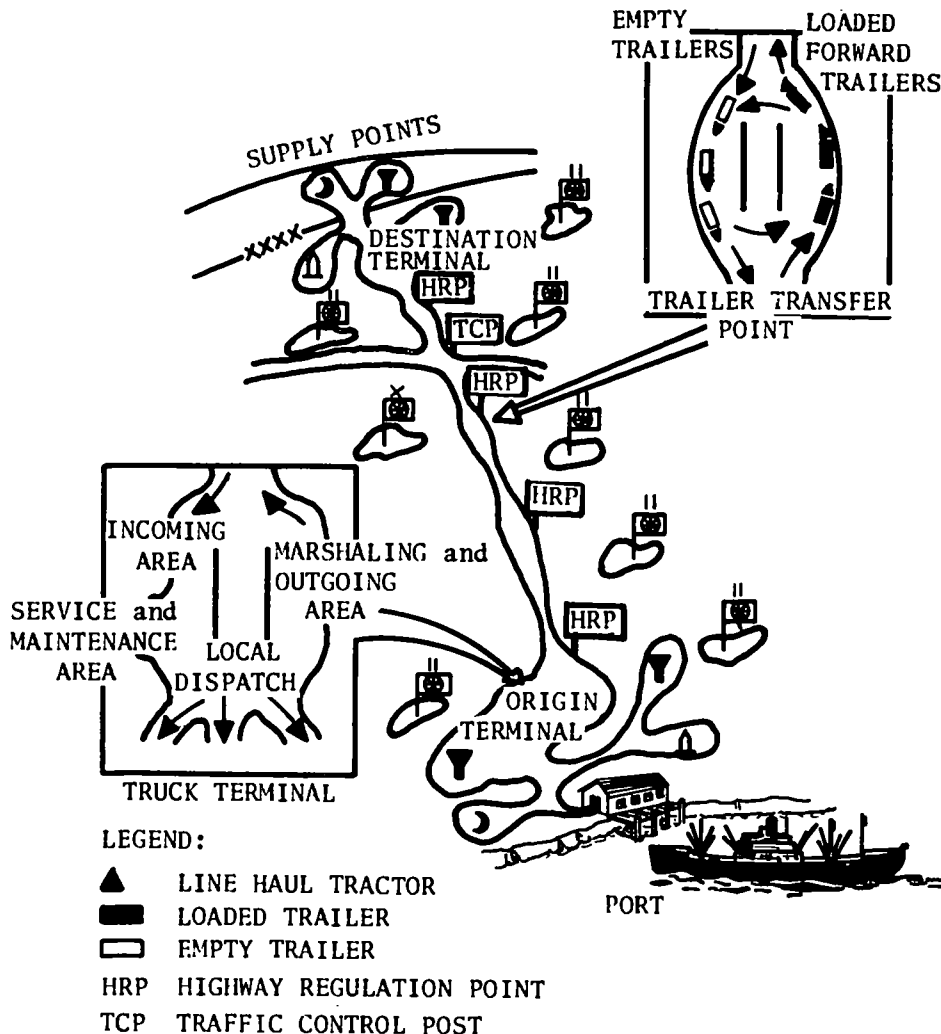


Figure 2. Type express operation (line haul).

c. Military police traffic control personnel should be provided at busy intersections and other congested areas to assist express traffic. In areas where local police are retained as a functional organization, they may supplement military police, particularly in control of civilian vehicle and pedestrian traffic.

d. Wrecker service and mobile maintenance teams should be provided at strategic points for repair and recovery of disabled vehicles.

44. Assignment of Semitrailer Equipment

The use of motor transportation permits the employment of company-size units in a wide variety of tasks under many different circumstances. Since one or more units must often

operate independently, it is essential that each truck unit be assigned semitrailers to meet specific requirements.

a. The medium truck company may be assigned stake and platform, refrigerator, fuel transporting, or other types of semitrailers to perform its assigned mission. This variety of semitrailers enables the company to provide suitable transportation without a change in basic organization or operating procedure.

b. The ratio of semitrailers to truck tractors is dependent upon the ratio of traveltime to loading and unloading time. The number of semitrailers assigned is based on maximum operating time for the tractor.

45. Accountability for Semitrailer Equipment

a. The commanding officer of the motor transport unit responsible for the operation may solve his semitrailer supply problem in a number of ways. If relay operations are to be of short duration, he may leave the semitrailers assigned to companies and impose stringent measures for maintaining responsibility over semitrailers away from parent units. However, it may be preferable to transfer informal accountability for semitrailers to either his unit or subordinate command units and maintain property books and control records at those levels.

b. AR 735-31 authorizes the motor transport command, group, or battalion to assume informal accountability for semitrailer equipment of assigned companies when a relay operation is established. This provision may be implemented by direction of the theater commander or on order of the commanding officer of the motor transport command, group, or battalion. At the discretion of the appropriate supply agency, equipment modification lists and other records may be used to simplify accountability and to fix direct responsibility.

c. When the provisions of AR 735-31 are put into effect, the truck company commander is relieved of informal accountability for semitrailer equipment previously assigned to his unit. He is, however, charged with direct responsibility for the semitrailers with which he is operating and must insure that adequate care is given all semitrailers in his custody.

d. The appropriate motor transport headquarters must establish informal accountability and provide for the maintenance of property records in its supply section. Further, the headquarters must establish, through its operations section, reporting and control procedures that can pinpoint the location of semitrailers wherever they are within the system and specify and hold responsible that unit or person having custody of the equipment at a particular time.

e. Upon entry into the operational phase of a relay system, the appropriate headquarters establishes a trailer accounting office within

the supply section. Individual truck units are relieved of informal accountability for trailers and semitrailers; the information is recorded in a consolidated trailer property book maintained by the headquarters. Upon completion of the operation, return of the units to routine operations, or transfer to another command, the consolidated property book is adjusted to reflect the current status of on-hand semitrailer equipment and hand receipts are made reassigning equipment to the companies.

46. Control of Semitrailer Equipment

In this centralized operation, accountability and control of semitrailer equipment are vested at the same level of command. The supply section of the headquarters unit assumes responsibility for the equipment, and the operations section of the headquarters unit assumes responsibility for control. Control is effected through reports from units and the maintenance of records. Maximum use of high-speed communications, confirmed by written reports, is imperative to accomplish this requirement.

a. The reports forwarded to the operations section place responsibility for equipment on the unit having the equipment at a particular time. They also give the operations section a daily check on the location of all semitrailer equipment in the system and on the status and condition of such equipment.

b. Information received from operating units on their daily yard check and outgoing trailer movement reports (para 47) should be posted on a control board in the operations office. This control board, in addition to indicating the status of semitrailer equipment throughout the system, is an invaluable aid to the commander in controlling the operation, assessing responsibility for semitrailers needing repair, locating lost or delayed semitrailers, and rerouting cargo loads en route. The simplest form of control board is one which semitrailers are listed by registration numbers and terminals and trailer transfer points are listed in sequence according to route of travel. Locations of semitrailers may be indicated by tabs and loads and destinations by various colors or notations on the tabs. Semitrailers loading or unloading at supply installations may be

charged to the appropriate terminals, or separate columns may be provided on the board to indicate these locations.

47. Records

a. Trailer Receipt.

- (1) Semitrailers are receipted for whenever they are exchanged. DA Form 1317-R (Trailer Receipt) (fig. 3) provides documentation for the receipt of both loaded and empty trailers moving into and out of truck terminals and received at trailer transfer points. The form contains spaces for listing all semitrailers of a particular convoy and for noting deficiencies. The trailer receipt is also used to fix responsibility for the condition of the trailers listed.
- (2) Trailer receipts are retained in the files of units operating terminals or trailer transfer points to support their daily yard check and outgoing trailer reports. The receipts are prepared by the dispatching unit in triplicate: copy 1 to prove acceptance by a succeeding convoy commander, terminal, or trailer transfer point; copy 2 to pass with the trailer as a memorandum of the exchange; and copy 3 to serve as a temporary receipt from the convoy commander to the dispatching unit.

b. Daily Yard Check. Units responsible for truck terminals accomplish a DA Form 1318-R (Daily Yard Check) (fig. 4) for all semitrailers on hand. The form is divided into separate sections for empty and loaded semitrailers. Where applicable, appropriate information from trailer receipts on equipment deficiencies is made on the daily yard check. This form is completed as of a designated hour each day to provide the operations section with current data regarding operational equipment.

c. Daily Outgoing Trailer Report. Units responsible for truck terminals complete a DA Form 1319-R (Daily Outgoing Trailer Report) (fig. 5) as of the same hour specified

for the daily yard check. This form covers all semitrailers dispatched since the previous report and lists deficiencies in the *Remarks* section. DA Form 1319-R is transmitted to higher headquarters with DA Form 1318-R.

d. Weekly Trailer Location Report.

- (1) DA Form 1320-R (Weekly Trailer location Report) (fig. 6) is accomplished on a specified day each week by the vehicles operations section of the headquarters maintaining informal accountability and control of semitrailers in the relay operation. This report reflects the information contained on the control board as of a specific day. The weekly report serves as a check on the equipment accounting and reporting system and indicates the number of consecutive days a semitrailer has been at an installation, either loaded or empty. This report gives commanders an indication of mismanagement: if operational equipment is not being fully utilized, the weekly report reveals the misuse to the commander.
- (2) The weekly report is forwarded to subordinate commands as a cross-check on semitrailers in their yards as reported on daily yard checks. Subordinate commands use this report to note semitrailers reported at supply installations within their area of responsibility and to cause follow-up checks to be made when necessary.

e. Motor Freight Waybill.

- (1) The Transportation Control and Movement Document (DD Form 1384) is provided to document the movement of military supplies and equipment. However, in the absence of this or other documentation, loaded trailers may be originally documented by shipping agencies on DA Form 1635-R (Motor Freight Waybill) (fig. 7). This document accompanies the shipment to its final destination, except where redocumentation is required because of offloading or unloading of

TRAILER RECEIPT						
Received from <u>Capt R Kilroy</u> of the (Terminal Agent, Convoy Commander or Driver) <u>132nd Trans Motor Trans Bn</u> the following listed trailers in good (Transportation Bn (Truck)) condition. (Exceptions noted in Remarks)						
LINE ITEM	VEHICLE REG. NO.	LOAD CLASS	TONS	SHIPPER	WAYBILL NO.	REMARKS
1	01180241	Ord IV	12	RAD	914453	No exceptions
2	01179232	Empty	—	—	—	Tare missing
Date and Time 22 1420 Apr 1965		Unit 448 th Trans Motor Trans Bn		Signature, Grade and Organization John Dillon, Capt, T.C.		

DA FORM 1317-R
1 May 55

4328-63

Figure 3. DA Form 1317-R (Trailer Receipt).

DAILY YARD CHECK				
TO:		FROM:		Time and Date
37 th Trans Motor Trans Comd		148 th Trans Motor Trans Bn		221600 Apr 1965
LINE ITEM	SECTION I EMPTY TRAILERS	SECTION II LOADED TRAILERS		REMARKS
	Trailer Registration Number	Trailer Registration Number	Destination	
	0118011	01181063	Karlsfeld Ord Dep	Sec I and II: No exceptions
2	01179347	01179378	Karlsfeld Ord Dep	Sec I: No exceptions Sec II: Landing gear damaged
3	01147346	01179937	Mannheim Ord Dep	Sec I and II: No exceptions
4	01179913	01147050	Bobligen	Sec I: No exceptions Sec II: Tarp missing
5	01180173	01179873	Rhein Engr Dep	Sec I: Tarp missing Sec II: No exceptions
6	012980			Sec I: No exceptions
7	0129756			Sec I: No exceptions

DA FORM 1318-R, 1 May 55

Figure 4. DA Form 1318-R (Daily Yard Check).

DAILY OUTGOING TRAILER REPORT							
TO: <i>37th Trans Motor Trans Canada</i>				FROM: <i>24th Trans Motor Trans Br</i>		Time and Date <i>221600 Apr 1965</i>	
LINE ITEM	VEHICLE REGISTRATION NUMBER	*LOAD CLASS	DESTINATION	TIME OF DEPARTURE	UNIT MOVING TRAILER	CONVOY COMMANDER OR DRIVER	REMARKS
1	0114001	E	HED	1015	67 th	Moore	No exceptions
2	01179345	L	HSD	0845	68 th	James	No exceptions
3	01179420	L	Mannheim	1050	68 th	Bryant	No exceptions
4	01179565	E	HED	0930	67 th	Reeves	No tarp
5	01179931	E	HED	0915	67 th	McCann	End gate broken
6	01180081	E	HED	0845	68 th	James	No exceptions
7	01179833	E	Rhine Main	0745	67 th	Johnson	No exceptions
8	0118004	E	Rhine Main	0745	67 th	Johnson	No tarp
9	01179425	L	Mannheim	1050	68 th	Bryant	No exceptions
10	01179843	L	Mannheim	1050	68 th	Bryant	No exceptions

*L--Loaded, E--Empty

DA FORM 1319-R, 1 May 55

Figure 5. DA Form 1319-R (Daily Outgoing Trailer Report).

WEEKLY TRAILER LOCATION REPORT											
TO: (Battalion)					FROM: (Headquarters)			Date			
24 th <i>Trane Motor Trane</i> <i>Br</i>					37 th <i>Trane Motor</i> <i>Trane Comd</i>			22 Apr 65			
LINE ITEM	TRAILER REGISTRATION NUMBER	TERMINAL OR MARSHALING YARD				SUPPLY INSTALLATIONS					
		No. 1 <i>Trane</i>	No. 2 <i>Trane</i>	No. 3 <i>Judig</i>	No. 4 <i>Trane</i>	KOD	MOD	RED	HED	NOD	
1	01146519				L28						
2	01146944		L22								
3	01179346				L14	<i>for Nancy</i>					
4	01179763	E2									
5	01179779			E22							
6	01179795									L16	
7	01179821							E30			
8	01179822		L22	<i>for Verden</i>							
9	01179823			E12							
10	01179839				E14						
11	01179853		L15								
12	01179885	E23									

Typed Name and Grade A. P. HILL, Lt Col, TC	Signature <i>A. P. Hill</i>
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DA FORM 1320-R, 1 May 55

Figure 6. DA Form 1320-R (Weekly Trailer Location Report).

MOTOR FREIGHT WAYBILL			DATE 22 Apr 65		WAYBILL NUMBER C-5348		COPY 1	
CARRIER NUMBER USA 01179111			UNIT IDENTIFICATION 37 th Trans Motor Trans Comd			SEAL NUMBERS NA		
FROM: (Consignor) Nana Sig Dep 701 APO 11						ROUTING NA		
TO: (Consignee) Pimasena Sig Dep 706 APO 222						SPECIAL INSTRUCTIONS L-54 Fragile		
MOVEMENT AUTHORITY (Line or re- lease No.)	PACKAGES		DESCRIPTION	WEIGHT (In pounds)	CUBE	REMARKS		
	Number	Kind						
L-41	50	Reels	Wire, W-110-B	7902	186			
L-54	4	Bones	Radio, SCR 506 A, set 1, boxes 1/4, 3/4, 3/4, 1/4	376	8			
L-54	4	Bones	Radio, SCR 506 A, set 2, boxes 1/4, 2/4, 3/4, 1/4	376	8			
				8654	202			
EXCEPTIONS None								
SIGNATURE OF CARRIER REPRESENTATIVE R. Gray				SIGNATURE OF CONSIGNEE F.S. Scott				
GRADE Cee	UNIT 2066 Trans Co, 1st Lb			GRADE 1st	UNIT PSD 706			
TIME 0810	DATE 22 Apr 65			TIME 1530	DATE 22 Apr 65			

DA FORM 1635-R, 1 MAR 56

8662-59

Figure 7. DA Form 1635-R (Motor Freight Waybill).

cargo at an intermediate destination. In this event the new document accompanies the shipment. The original is retained in the files at the intermediate destination to verify the transaction. Every effort should be made to insure that documentation for individually documented trailers accompanies the trailers during transport. This may be accomplished through the use of a carrier box or pouch mounted on the trailer, or through strict supervision and handling of documentation carried by vehicle drivers or convoy commanders,

- (2) The motor freight waybill may be used as a trailer receipt, provided sufficient copies are available. Depending upon the situation, the headquarters responsible for relay operations may arrange with the agency at origin to reproduce enough copies to be used as receipts. When the load is delivered at destination, the consignee or his authorized representative must sign a copy of the freight waybill or otherwise receipt for cargo delivered. The driver or convoy commander returns this receipt to his parent organization for retention in unit files. Pertinent information may be extracted from the receipt for records or for transmission to higher headquarters.

48. Maintenance

a. General. Maintenance and repair services for vehicles employed in relay operations are the same as for all military vehicles. However, modifications in usual procedure may be required. Normally, military vehicles may operate 4 to 6 hours a day, but in relay operations

equipment may operate 20 hours a day, thereby increasing maintenance requirements. In addition to the normal mechanic augmentation provided to truck units in round-the-clock operations, it is often necessary to assign non-driver personnel as mechanic's helpers.

b. Consolidated Maintenance. Consolidated maintenance permits maximum utilization of maintenance skill and maintenance facilities. To provide a service section at a truck terminal the battalion headquarters draws from its assigned companies the required mechanic personnel, tools, and equipment. Consolidated maintenance may be provided in three ways, depending on the conditions:

- (1) Grouping all company maintenance personnel into one centralized area or pool.
- (2) Drawing only the mechanics required to accomplish those consolidated maintenance activities under battalion supervision.
- (3) Detailing company mechanics to the battalion maintenance service and rotating them on a day-to-day shift basis.

c. Maintenance Records. When semitrailers are employed in relay operations, they are away from the parent unit much of the time and individual units cannot retain maintenance records and individual vehicle files for semitrailers employed throughout the system. These files may be maintained at the central accounting office, and all other necessary papers may accompany the semitrailer; in such an operation, a watertight compartment may be built in the semitrailer to hold necessary papers. If no papers accompany the semitrailer, a maintenance schedule board may be stenciled on the tarp box for recording scheduled maintenance services.

CHAPTER 7

MOTOR MOVEMENT PLANNING

Section I. GENERAL PLANNING

49. General

This section provides guidance for the planning of motor transport operations by Army units. The techniques and procedures discussed are applicable to both tactical and administrative operations and may be adapted to meet the needs of any situation. (See also paras 11-16.)

50. Preliminary March Data

a. The march planner, having certain basic data, may determine by simple arithmetic additional information about a movement. He normally knows the number and types of vehicles in the column, the origin and destination of the convoy, and the time of arrival at destination. From his map he can determine the number of miles or kilometers that the convoy must travel and from his schedule the number of hours that the move should require. By dividing miles or kilometers by hours, he can determine the rate of march that vehicles must maintain to meet the schedule. With his knowledge of road conditions and of the skill of the drivers, he can establish safe driving distances, determine positions of vehicles in the column, and form march units.

b. Road movements for small units may be planned with a minimum of preliminary data. The commander must first know the assigned task or mission, the destination, the time of completion, and the equipment required. In addition to this basic information, he determines the departure time, the road distance, the time distance, and the required rate of march. On the basis of this information, an adequate road movement plan can be produced that may be easily implemented by an operation order.

c. The larger and more complex the movement, the more complete and detailed the plan-

ning must be. If the movement is scheduled over a dispatch route, exact data are needed as to road space allocated, time space allowed, and other factors of lead, gap, and length in time and space. The rate of movement necessary to meet the schedules must be determined. In consideration of the mission, the planner determines the tactical or administrative purpose of the move, special measures or arrangements necessary to insure its accomplishment, and the load to be transported. In regard to the march formation, the planner considers the number and types of vehicles or units required, the method of dispatch or grouping for movement and relative positions in the column, and the time required for the move based on maximum allowable speeds of the vehicles, their average running times, and the effect of the rate of march on march organization. In selecting the route to be traveled, the march planner considers loading points for elements of the convoy, start point for the movement, critical points along the route, scheduling of halts, probable traffic and road conditions, and release points.

d. To facilitate planning for road movement and timely dissemination of pertinent information to the troops concerned, personnel planning the movement normally use such planning aids as march formulas, road movement graphs, and road movement tables. Checklists compiled by the personnel concerned are also helpful to insure the inclusion of all information necessary to efficient operation. In addition to the planning aids discussed in this chapter, a type time-distance table for selected vehicle speeds is shown in appendix IV.

51. Distance, Time, and Rate Factors

The relationship between distance and time is the basis for all march planning (fig. 8). Distance factors and their corresponding time

factors pertaining generally to columns or elements within columns are as follows:

Length ----- Time length
 Gap ----- Time gap (time interval)
 Lead ----- Time lead (headway)
 Road space ----- Time space
 Road distance ----- Time distance
 Road clearance distance ----- Road clearance time

a. *Distance Factors.* The distance factors of a march may be expressed in miles, yards, and feet or in kilometers and meters. The metric system is used in military and foreign maps. However, in the United States nonmilitary maps show distances in miles. Distance factors are defined below:

- (1) The length of any column or element of a column is the length of roadway it occupies, measured from front to rear.
- (2) Gap is the distance between succes-

sive vehicles or elements in a column or between successive columns as measured from the rear of one element to the front of the following element. Vehicle gap is the space between consecutive vehicles in a column, and column gap is the space between the elements of a column (STANAG 2154).

- (3) Lead is the linear spacing between the heads of elements in a column or between heads of successive vehicles, serials, march units, or columns.
- (4) Road space is the total length of roadway occupied by a column or an element thereof. It may include any additional space that may be required as a safety factor or to maintain flexibility. When no safety factor is

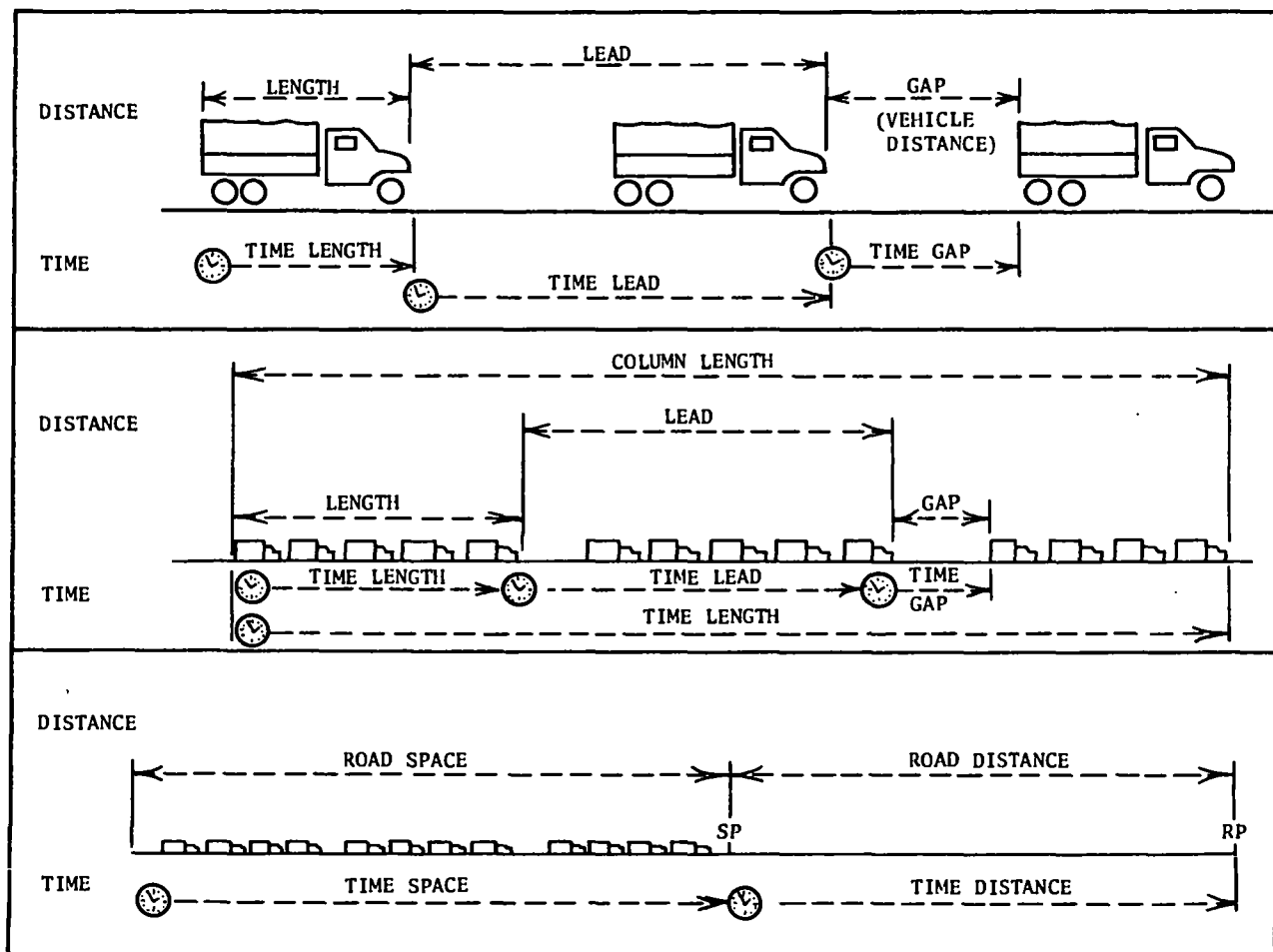


Figure 8. Distance and time factors.

applied, road space is synonymous with column length.

- (5) Road distance is the distance from point to point by road, expressed in miles or kilometers.
- (6) Road clearance distance is the total distance that the head of the column must travel for the entire column to clear a given section of road.

b. Time Factors. Time factors are used to clock the relative positions and passage of elements of a march and are expressed in seconds, minutes, or hours. Each of the following time factors is related to a corresponding distance factor as indicated in *a* above:

- (1) Time length, or pass time (STANAG 2154), is the time required for a column or element thereof to pass a given point.
- (2) Time gap (time interval) is the time between the tail of one element or vehicle and the head of the next as they move past any given point.
- (3) Time lead (headway) is the time between the head of one element and the head of the next. (For individual vehicles, there is little difference between time gap and time lead.)
- (4) Time space is the time consumed while a column or element thereof proceeds past any point en route. It includes time gaps between subordinate elements and may include any additional time added for safety and flexibility.
- (5) Time distance is the time required to move from one point to another at a given rate of speed.
- (6) Road clearance time is the time a column or element thereof requires to travel over and clear a section of road. Road clearance time equals time distance plus the time length of the column.

c. Rate of Movement. Rate of movement is the ratio of distance to time. Although no exact distinction is made between terms expressing rate of movement, the following distinctions are helpful to march planners:

- (1) Speed is the actual rate at which a vehicle is moving at a given time as registered on the speedometer. It is usually expressed in miles or kilometers per hour.
- (2) Pace is the regulated speed of a column or element as set by the pace setter. It undergoes constant adjustment, owing to terrain and road conditions along the route of march.
- (3) Rate of march is the average distance traveled in any given period of time, including periodic halts and other short delays. It is expressed in miles or kilometers in the hour. (This factor is not broken down into minutes.)

d. March Formulas. March formulas are the basic arithmetic of march planning. By means of these simple formulas, the planner may solve for the unknown factor necessary for the completion of his movement plan. When two of the basic march factors of distance (D), time (T), and rate (R) are known, the third may be found by simple arithmetic equation:

$D = R \times T$ (distance equals rate multiplied by time)

$T = \frac{D}{R}$ (time equals distance divided by rate)

$R = \frac{D}{T}$ (rate equals distance divided by time)

Any of the distance factors may be substituted in the equation if the corresponding time factors are also substituted. For example—

- (1) *Determining distance factors.*
 - (a) Gap (yards or meters) equals rate (yards or meters per minute) multiplied by time gap (minutes).
 - (b) Lead (yards or meters) equals rate (yards or meters per minute) multiplied by the time lead (minutes).
 - (c) Distance (miles or kilometers) equals rate (miles or kilometers in the hour) times time distance.
- (2) *Determining time factors.*
 - (a) Time length (minutes) equals the length (yards or kilometers) divided by rate (yards or kilometers minute).
 - (b) Time lead (minutes) equals lead

(yards or meters) divided by rate (yards or meters per minute).

- (c) Time space (hours) equals road space (miles or kilometers) divided by rate (miles or kilometers in the hour).
- (d) Time distance (hours) equals road distance (miles or kilometers) divided by rate (miles or kilometers in the hour).
- (3) *Determining rate factors.* Rate (miles or kilometers per hour) equals road distance (miles or kilometers) divided by time distance (hours).
- (4) *Converting factors into others of the same class.*
 - (a) Length plus gap equals lead.
 - (b) Time length plus time gap equals time lead.
 - (c) Distance in miles multiplied by 1,760 equals distance in yards.
 - (d) Distance in kilometers multiplied by 1,000 equals distance in meters.
 - (e) Distance in kilometers multiplied by .621 equals distance in miles (approximately).
 - (f) Distance in miles multiplied by 1.6093 equals distance in kilometers (approximately).
 - (g) Time in hours multiplied by 60 equals time in minutes.

52. Road Movement Graphs

Road movement graphs are time-space diagrams for the visual presentation of movement so that conflicts and discrepancies can be prevented in the planning stage before congestion occurs on the route. Road movement graphs are used by staffs in planning and, when applicable, in supervising or regulating complicated movements. They are also used in preparing and checking road movement tables, and they provide a convenient means of recording actual moves of units over a period of time. The unit of measure used (miles or kilometers) depends on the requirements of the authorities concerned. (An example of a road movement graph is contained in appendix C, STANAG 2041.)

53. Road Movement Tables

Road movement tables are a convenient means of transmitting to subordinates their schedules and other essential details pertaining to a road move. This is particularly true in cases where the inclusion of such details in the body of the operation order would tend to complicate it or to make it unduly long. Road movement tables consists of two parts: the first being data paragraphs reflecting general information or information common to two or more serials; the second, a list of serials, together with all other necessary information, arranged in tabular form. The security classification given road movement tables is in accordance with the contents and is not necessarily the same as that given the operation order. (An example of a road movement table is contained in appendix B, STANAG 2041.)

54. Unit SOP's

Standing operating procedures are prepared by units, usually down to and including those of company size, to simplify the preparation and transmission of orders; to simplify and perfect the training of troops; to promote understanding and teamwork between commander, staff troops, and installations; to facilitate operations, and to minimize confusion and errors.

a. Requirements. The requirements for, and the scope of, unit SOP's vary with the size of the unit concerned, its organization, and its normal missions. Certain prerequisites, however, are common to all units. These include conformity with the SOP of the next higher unit, sufficient flexibility to allow addition or deletion without demanding major revision, sufficient detail to avoid ambiguity, and avoidance of repetition of material contained in field manuals available to the unit.

b. Items Covered in Motor Movement SOP's. The following items may be included in the unit movement SOP:

- (1) Standard organization of columns for movement, including the grouping of vehicles and specification of group commanders as applicable.
- (2) Composition and duties of the advance party or reconnaissance echelon.

- (3) Priorities of movement of columns or elements.
- (4) Responsibility for manning start point and release point.
- (5) Discipline en route, use of lights, and procedures at halts.
- (6) Traffic densities and speeds.
- (7) Posting of guides and markers and traffic control measures.
- (8) Normal vehicle loads, including personnel.
- (9) Action in the event of enemy attack and passive defense methods.

- (10) Supply, maintenance, and evacuation procedures.
- (11) Communications, required reports, and liaison methods.
- (12) Location of medical facilities along route of march.

c. Form of Publication. The unit SOP may be prepared in the form most convenient for the purpose of the unit concerned. Smaller units normally prepare an SOP covering all functions of the unit in either pamphlet or looseleaf form. Larger units may prepare separate pamphlets for diverse functions, issuing only those applicable to specific subordinate units.

Section II. PLANNING FOR LINE-HAUL OPERATIONS

55. General

The information contained in this section provides for the planning and establishment of a line-haul move involving the operation of truck terminals and trailer transfer points. It discusses the establishment of such facilities and the computations necessary to determine the number of transportation units required to operate the line haul. Section I is used in conjunction with this section to provide general operational planning. (See also paragraphs 29 and 31 and chapter 6.)

56. Location of Truck Terminals

If the tasks for a particular operation include line haul and the semitrailer relay method is to be used, truck terminal locations must be planned at points of cargo ingress and egress on the routes selected. Truck terminals are normally located slightly forward of points where cargo is to be picked up and slightly to the rear of points where cargo is to be delivered.

57. Location of Trailer Transfer Points

When required, trailer transfer points are established along the line-haul system. These points provide facilities for the exchange of semitrailers or trucks and may provide mess, maintenance and miscellaneous administration. Trailer transfer points are not used for pickup and delivery of cargo; they divide the

line haul into legs for operational efficiency. The length of a leg is selected on the basis of time distance, the most desirable time distance being 4 hours for advance planning. In operational planning, the desirable time distance of a leg is determined by deducting relay time and all other delays from a 10-hour work shift and halving the remaining time to determine one-way running time between trailer transfer points. This permits each driver to complete one round trip per shift, precluding the requirement for billeting drivers away from their assigned unit and simplifying the provision of rested drivers for each trip and the maintenance of vehicles. The actual length of legs between trailer transfer points may vary slightly from the desirable time distance because of the necessity for placing such installations at physically suitable sites. Moreover, a line haul can seldom be divided into legs of equal length. The uneven leg, long or short, should be positioned on the forward end of the haul; thus fewer facilities will have to be relocated in the event of expansion.

58. Location of Motor Transport Units

a. In selecting sites for motor transport operating units and activities, factors that affect ability to perform the mission must be considered. The location should be on ground that will support sustained occupation by vehicles, on a road net capable of supporting the operation, and in the vicinity of supported activ-

ities. The size and complexity of the operation, number and type of vehicles employed, facilities to be located at the terminal, type of dispatch to be used, anticipated backlog of semitrailers in the terminal, and other operational factors govern the size of the area required for the terminal.

b. Defensibility of the area must also be considered. Local defense and security may be attained by locating on favorable terrain in the vicinity of built-up areas where security may be provided. Concealment and cover may be important considerations. Defense plans must be coordinated with those of other friendly units in the vicinity.

c. The capability of the enemy will indicate the degree of dispersion required. However, the ability of motor transport units to disperse will be limited by the nature of the terrain, availability of personnel, and the degree of operating efficiency maintainable while dispersed. A balance must be obtained between the dispersion necessary for passive defense and that which will allow the unit to accomplish its mission efficiently.

59. General Planning Factors

a. Motor transport planning, particularly in its earliest stages, must often be based on broad planning factors and assumptions. However, because of the varied services performed, the type of loads carried, and varied terrain features over which motor transport operations are conducted, planning factors should be used with caution and applied only in the absence of specific data on the local situation.

b. In the absence of specific data, the following factors are used in motor transport planning for computing truck and truck company requirements (tables V-XIV):

- (1) The average number of assigned task vehicles not in maintenance and therefore available for daily operations:

Operational short range — 83 percent.

Long-range planning — 75 percent.

- (2) The anticipated payload per vehicle:
Offroad—rated capacity of vehicle.

Highway—rated capacity plus 50 percent for trailers or semitrailers and 100 percent for tactical wheeled vehicles.

- (3) The daily round trips that a vehicle averages (these vary with running time and time for delays):
Line haul—one per operating shift (10 hours).
Local hauls—four per day.
- (4) The one-way distance cargo is to be hauled, from which roundtrip mileage may be computed:
Line haul—100 miles one way.
Local haul—15 miles one way.
- (5) The average number of miles covered in an hour, including short halts during the period of movement:
Poor roads—10 miles in the hour.
Good roads—20 miles in the hour.
- (6) Turnaround time—time consumed in round-trip movement including delays.
- (7) Delay—time consumed in loading and unloading and relay time in line haul relay operations. (Time for halts and delays en route, such as mess halts, ferrying operations, etc., which can be anticipated but are not included in the rate of march, must be considered and included in delay time.)
Straight trucks—2.5 hours loading and unloading time per round trip.
Semitrailers in relay operation—1 hour per relay; 2.5 hours loading and unloading time per round trip.
Truck tractors in relay operations—1 hour per relay.
- (8) The number of hours per day in which vehicles with drivers are normally employed:
One shift (peacetime)—10 hours.
Round-the-clock (wartime) — 20 hours.
- (9) Unit lift and daily lift—unit lift is the amount of cargo a truck unit is expected to move at one time; daily lift is that which it can move in a

day, making a number of trips (tables V-XIV).

- (10) Ton-miles and passenger-miles—the product of the number of tons or passengers times the number of miles moved.

60. Unit and Vehicle Capability Estimates

a. In the early stages of planning, unit capability estimates may be more convenient to use than other planning factors. These are shown in table I.

Table I. Unit Capability Estimates

Local haul—short tons per day (vehicle availability $\times$ average tons per vehicle $\times$ trips per day = short tons per day):

Light truck company (2½-ton trucks)	45 $\times$ 4 $\times$ 4 = 720
Light truck company (5-ton trucks)	45 $\times$ 6 $\times$ 4 = 1,080
Medium truck company (12-ton semitrailers)	45 $\times$ 12 $\times$ 4 = 2,160
Medium truck company (POL) (5,000-gallon tankers)	45 $\times$ 15 $\times$ 4 = 2,700
Medium truck company (7½-ton refrigerator vans)	45 $\times$ 6 $\times$ 4 = 1,080
Heavy truck company (50-ton semitrailers)	18 $\times$ 40 $\times$ 4 = 2,880

Line haul—forward ton-miles per day (vehicle availability $\times$ tons per vehicle $\times$ miles forward = ton-miles per day):

Light truck company (2½-ton trucks)	45 $\times$ 4 $\times$ 100 = 18,000
Light truck company (5-ton trucks)	45 $\times$ 6 $\times$ 100 = 27,000
Medium truck company (12-ton semitrailers)	45 $\times$ 12 $\times$ 100 = 54,000
Medium truck company (POL) (5,000-gallon tankers)	45 $\times$ 15 $\times$ 100 = 67,500
Medium truck company (7½-ton refrigerator vans)	45 $\times$ 6 $\times$ 100 = 27,000
Heavy truck company (50-ton semitrailers)	18 $\times$ 40 $\times$ 100 = 72,000

b. Vehicle capabilities as indicated in tables II and III may be used in conjunction with other planning factors. Additional vehicle and unit capability data are contained in FM 55-15.

Table II. Vehicle Payload Capacities for General Planning

Nomenclature	Off-road (tons)	Highway average (tons)	Highway maximum (tons)	Towing capacity (tons)		Passengers a	Cargo space
				Highway	Cross country		
Automobile, sedan, lt	-----	-----	-----	--	---	4 ^b	-----
Bus, convertible, 37-passenger	-----	-----	-----	--	---	37 or 18 litters	-----
Carrier, lt wpn, inf, ½-ton, 4x4	½	-----	½	--	---	-----	25 sq ft
Carrier, pers, full-tracked, armd, M59	1½	1½	1½	--	---	10	-----
Carrier, pers, full-tracked, armd, M113E2	-----	-----	-----	--	---	11	-----
Stlr, cgo van, 6-ton, 2-wheel, M119	6	9	9	--	---	24 ^c	1,020 cu ft
Stlr, shop, van, 6-ton, 2-wheel, M146	6	8	8	--	---	-----	1,675 cu ft
Stlr, stake, 6-ton, 2-wheel, M118	6	9	9	--	---	24 ^c	1,130 cu ft
Stlr, reefer, 7½-ton, 2-wheel	6 ^d	6	7½	--	---	-----	790 cu ft
Stlr, stake, 10-ton, 2-wheel	10	12	12	--	---	50 ^c	1,014 cu ft
Stlr, van, 10-ton, 4-wheel	-----	8	10	--	---	50 ^c	1,355 cu ft
Stlr, cgo, 12-ton, 4-wheel, M127A1	12	12	18	--	---	50 ^c	384 sq ft
Stlr, low-bed, 12-ton, 25-ft	12	16	18	--	---	-----	200 sq ft
Stlr, sup van, 12-ton, 4-wheel, M129	12 ^d	18	18	--	---	50 ^c	1,342 cu ft
Stlr, low-bed, 15-ton, 4-wheel, M172	25	16	25	--	---	-----	320 sq ft
Stlr, stake, 20-ton, 34-ft	20	18	24	--	---	65 ^c	1,400 cu ft
Stlr, van, 20-ton, 34-ft	20	18	24	--	---	65 ^c	1,349 cu ft
Stlr, low-bed, 25-ton, 4-wheel	25	25	30	--	---	-----	-----
Stlr, tk transporter, 50-ton, 8-wheel, M15A2	50 ^d	40	50	--	---	-----	-----

Nomenclature	Off-road (tons)	Highway average (tons)	Highway maximum (tons)	Towing capacity (tons)		Passen- gers a	Cargo space
				Highway	Cross country		
Stlr, low-bed, 60-ton, 8-wheel, M162	60	60	60	--	---	-----	204 sq ft
Stlr, tk, gas, 5,000-gal, 4-wheel, M131A2	3,000 gal ^d	5,000 gal	5,000 gal	--	---	-----	-----
Tlr, amph, cgo, ¼-ton, 2-wheel	¼	¾	¾	--	---	-----	60 cu ft
Tlr, cgo, ¾-ton, 2-wheel	¾	1½	1½	--	---	-----	175 cu ft
Tlr, cgo, 1½-ton, 2-wheel	1½	2¼	2¼	--	---	-----	283 cu ft
Tlr, ammo, 2-ton, 2-wheel	2	2	3	--	---	-----	-----
Trk, amb, frontline, ¼-ton, 4x4, M170	-----	-----	-----	--	---	4 ^b or 3 litters	-----
Trk, util, ¼-ton, 4x4	0.4	0.4	0.6	1	¾	2	66 cu ft
Trk, amb, ¾-ton, 4x4, M43	-----	-----	-----	--	---	8 ^b or 5 litters	-----
Trk, cgo, ¾-ton, 4x4	¾	1	1½	2	---	8	160 cu ft
Trk, amph, 2½-ton, 6x6, M147E2	2½	4	4	--	---	40 ^c	385 cu ft
Trk, cgo, 2½-ton, 6x6	2½	4	5	5	3	20	408 cu ft
Trk, dump, 2½-ton, 6x6	2½	4	5	5	3	20 ^c	67.5 sq ft
Trk, shop van, 2½-ton, 6x6, M220	2½	3½	3½	4	3	-----	-----
Trk, shop van, 2½-ton, 6x6, M292	2½	2½	2½	4	3	-----	-----
Trk, tk, gas, 2½-ton, 6x6, M217	2½	2½	2½	--	---	-----	-----
Trk, tk, water, 2½-ton, 6x6, M222	1¾	4¼	4¼	--	---	-----	-----
Trk, cgo, 5-ton, 6x6, (single tires)	5	6	7½	15	7½	20	513 cu ft
Trk, cgo, 5-ton, 6x6 (dual tires)	5	6	10	15	7½	20	513 cu ft
Trk, dump, 5-ton, 6x6	5	7½	7½	15	7½	15 ^c	135 cu ft
Trk, cgo, prime mover, 10-ton, 6x6, M125	10	10	15	25	15	-----	496 cu ft

a—Based on 18 inches per man. Does not include driver or assistant.

b—Less individual field equipment.

c—Recommended for emergency use only. No troop seats provided.

d—Not generally used for this type of operation.

Table III. Vehicle Utilized-Load Capacities

Load	Vehicle			
	2½-ton cargo truck a		10-ton stake and platform semitrailer	
	Sides in place, crane-loaded	Sides removed, forklift-loaded	Sides in place, crane-loaded	Sides removed, forklift-loaded
Cargo net	3	Not recommended	6	Not recommended
Cargo transporter, type 2	1 lengthwise	1 lengthwise	3 lengthwise	4 crosswise ^b
Stevedore pallet	2 crosswise	4 lengthwise	6 crosswise	8 lengthwise: 2 rows of 4 ^c
Unitized pallet	3 crosswise	5: 4 lengthwise and 1 crosswise	7 crosswise	10 lengthwise: 2 rows of 5 ^c
Warehouse 4 x 4 pallet	3	3	6	12: 2 rows of 6

a—Some 2½-ton, 6x6 cargo trucks have fender wells which project into the cargo space. In such cases, a level platform for the storage of a unitized cargo can be obtained by fitting a frame of 2 x 4 or 4 x 4 timbers flat in the cargo bed between the fender wells.

b—May be loaded by crane.

c—For 12-ton stake and platform semitrailer, increase by one in each row.

61. Highway Tonnage Capabilities

a. In selecting routes over which cargo is to be transported, consideration must be given

to capabilities of roads and bridges to sustain the operation. The gross weight of the heaviest loaded vehicle should not exceed the rated

tonnage capacity of the weakest bridge unless it is determined that the bridge will be strengthened before the operation begins. It is difficult to determine exact tonnage capabilities of highways for sustained operations because of varying conditions. The volume of tactical, administrative, and indigenous traffic to be accommodated on supply routes further restricts the capabilities of motor transport.

b. Highway capabilities contained in table IV may be used as a guide for estimating supply support tonnage capabilities of highways under varied conditions, assuming that

operations are sustained, that road maintenance is adequate, and that each road bears two-way traffic. When all limiting factors are involved, the sequence for application is as follows: first, apply the narrow roadway factor; then to the new capability, apply the limiting terrain factor; and finally, to the latter adjustment, apply the weather factor if the conditions are expected to exist for a sustained period. If only two factors are present, their sequence of application will follow in this pattern, whichever factor is not applicable being omitted.

Table IV. Highway Capability

Highway type	Daily tonnage forward (short tons)			Reductions applicable to various conditions (percentages) ¹				
	Optimum dispatch route only	Supply traffic, communications zone	Supply traffic, combat zone	Narrow roadway	Rolling terrain	Hilly w/th curves	Mountainous	Seasonal bad weather
Concrete -----	60,000	36,000	8,400	25	10	30	60	20
Bituminous ----	45,000	27,000	7,300	25	10	30	60	30
Bituminous treated -----	30,000	18,000	5,800	25	20	40	65	40
Gravel -----	10,150	6,090	3,400	25	20	50	70	60
Earth -----	4,900	2,940	1,600	25	25	60	80	90

¹ Factors are maximum under extreme conditions.

c. Planned tonnage movement should not exceed the capability of any portion of the road net to be used or of any bridge on the road net, unless reconstruction or heavy maintenance is provided to increase the capability of that section of highway or of the bridge to meet the demands. Otherwise, alternate routes must be selected to distribute the load. If no alternate routes are available and the indicated tonnage is not reduced, the highway or bridge can be expected to deteriorate rapidly and operations cannot be sustained. (It should be kept in mind that maintenance vehicles and personnel on a road may also interfere with the flow of traffic and thereby limit capability.) For more detailed information on highway capability estimation, see FM 55-15.

62. Formulas for Determining Unit and Vehicle Requirements

a. The following formulas are useful in computing unit or vehicle requirements on the basis of planning data discussed in paragraphs

59 through 61, actual operational data, or a combination of both. The number of units or vehicles required for workloads expressed in gallons, persons, or other unit of measure can be determined by substituting that unit of measure for tons in the formulas.

- (1) *One-time lifts.* The following formula is used to determine the number of truck companies or vehicles required to move a given number of tons in one lift:

$$\text{Companies required} = \frac{\text{tons to be lifted}}{\text{tons per vehicle} \times \text{vehicles available per company}}$$

$$\text{Vehicles required} = \frac{\text{tons to be lifted}}{\text{tons per vehicle}}$$

- (2) *Turnaround time.* Turnaround time can be determined by the following formula. (Caution must be exercised to insure that the delay factor is accurate. Turnaround time should be

rounded off to the nearest tenth for use in further computations.)

Turnaround time =

$$\frac{2 \times \text{distance}}{\text{rate of march (MIH)}} + \text{delays}$$

- (3) *Distance between truck terminals or trailer transfer points.* When locating truck terminals or trailer transfer points, the following formula is used

to determine the appropriate distance between these installations in order to obtain a specific turnaround time:

Distance =

$$\frac{(\text{turnaround time} - \text{delays}) \times \text{rate (MIH)}}{2}$$

- (4) *Sustained operations.* The following formula is used to determine the number of truck companies required to move a given daily tonnage in sus-

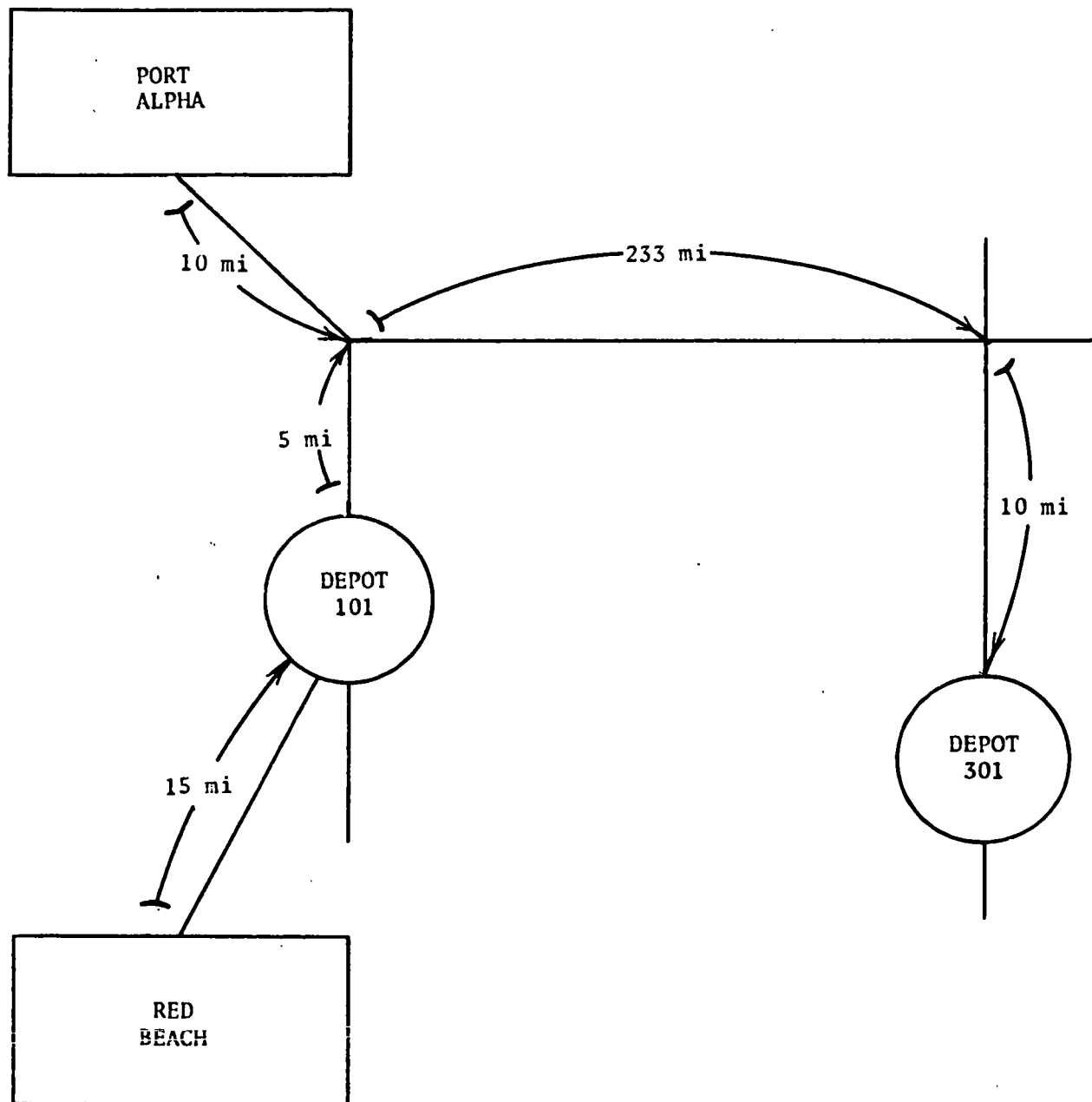


Figure 9. Route and facility diagram.

tained operations. (This formula is applicable to both local and line-haul operations. The number of vehicles required can be determined by omitting vehicles available per company from the formula.)

$$\frac{\text{Companies required} = \text{daily tonnage} \times \text{turnaround time}}{\text{tons per vehicle} \times \text{vehicles available per company} \times \text{operational day}}$$

b. An example follows of how the number of units required is determined. Locations of routes and facilities in the area for which the operation is being planned are shown in figure 9.

- (1) *Planning factors.* The following planning factors are noted:

20-hour-per-day operations for all equipment.

45 vehicles available per unit.

4 tons per 2½-ton truck.

12 tons per 12-ton cargo semitrailer.

20-MIH rate of march on all routes.

Delay time:

2.5 hours per round trip for loading and unloading straight trucks.

2.5 hours per round trip for loading and unloading semi-trailers.

1 hour relay time per each relay for truck tractors and semitrailers.

- (2) *Tonnage to be moved by highway.*

- (a) Information provided by the staff movements officer establishes tonnage to be moved by highway as follows:

3,600 short tons daily from Port Alpha to depot 301.

2,400 short tons daily from Red Beach to depot 101.

1,500 short tons daily from depot 101 to depot 301.

- (b) The tonnage information, with that known or assumed regarding routes and location of facilities, is graphically portrayed in figure 10.

- (3) *Types of units required.* Based on the preceding information, specific tasks, workloads, and types of units required can now be determined. Since the

operation will involve a line haul, it becomes necessary to determine the approximate locations of the origin and destination truck terminals for the line-haul task in order to separate line from local hauls and identify specific workloads and tasks. The origin truck terminal should be centrally located near the road intersection between Port Alpha and depot 101, provided a suitable site is available. The destination truck terminal should be located near the intersection north of depot 301 in order to be near the cargo's destination and to be on the main route to allow for expansion forward without relocation. Types of units required to accomplish the workload are as follows:

- (a) Line haul from origin truck terminal to depot 301, 5,100 short tons, medium truck companies.

- (b) Port clearance from Port Alpha to origin truck terminal, 3,600 short tons, medium truck companies.

- (c) Beach clearance from Red Beach to depot 101, 2,400 short tons, light truck companies.

- (d) Delivery of cargo from depot 101 to origin truck terminal, 1,500 short tons, medium truck companies.

- (e) Delivery of cargo from destination truck terminal to depot 301, 5,100 short tons, medium truck companies.

- (4) *Location of trailer transfer points.*

The planner is now ready to compute the number of units required for each task. However, before computing for the line-haul task, the location of trailer transfer points to divide the line haul into legs must be determined so that the total delays and the total turnaround time for the entire line haul can be computed. The distance to allow between trailer transfer points in order to obtain a turnaround time of 10 hours (one shift in the operational day) is obtained as follows (the 2-hour delay in the for-

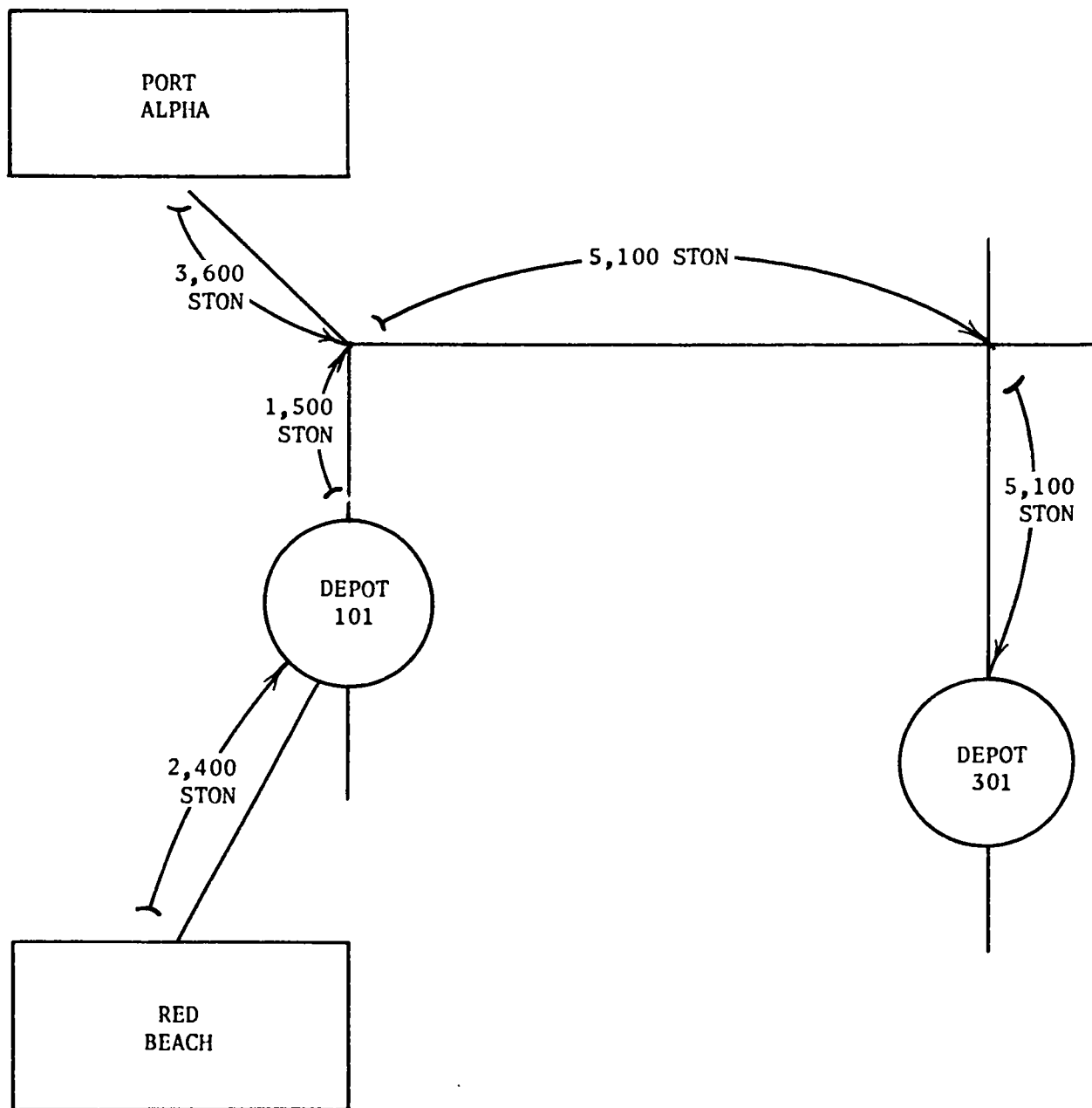


Figure 10. Tonnage information diagram.

mula results from 1-hour relay time at each trailer transfer point):

$$\text{Distance} = \frac{(10 \text{ hours turnaround time} - 2 \text{ hours delay}) \times 20 \text{ MIH}}{2}$$

$$= \frac{(10 - 2) \times 20}{2}$$

= 80 miles between trailer transfer points.

Trailer transfer points are then located as shown in figure 11. In addition to the consideration of distance to allow for the most desirable turnaround time, the planner must consider suitable sites for locating these facilities (para 58). Note that the short leg (73 miles) has been placed

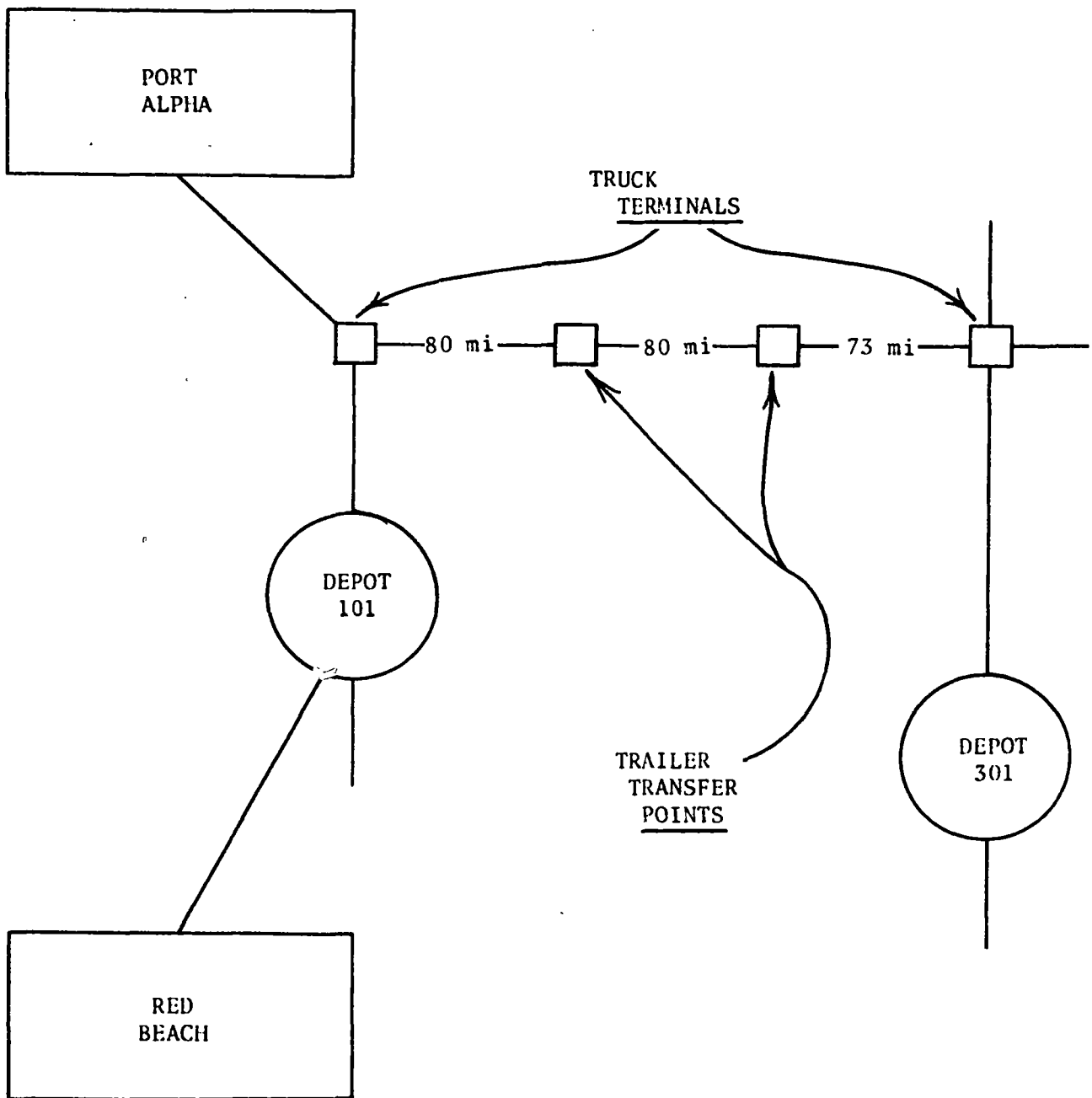


Figure 11. Location of truck terminals and trailer transfer points.

forward. This is to avoid relocating any but the most forward trailer

transfer point in the event of expansion of the operation.

- (5) *Medium truck companies required for the line-haul task.*

Daily tonnage = 5,100 short tons

Turnaround time = $\frac{2 \times 233 \text{ miles} + 6}{20 \text{ MIH}}$
 hours delay (1
 hour for each re-
 lay, 2 relays for
 each leg of the
 line haul)
 = 29.3 hours

Tons per vehicle (12-ton semitrailers)
 = 12 short tons

Vehicles available per company = 45

Operational day = 20 hours

Therefore

Companies required =
 $\frac{5,100 \text{ STON} \times 29.3 \text{ hours}}{12 \text{ STON} \times 45 \text{ vehicles} \times 20 \text{ hours}}$
 = 13.8 medium truck companies required

- (6) *Medium truck companies required to accomplish local-haul tasks.*

- (a) Movement of 5,100 short tons from destination truck terminal to depot 301:

Daily tonnage = 5,100 short tons

Turnaround time = $\frac{2 \times 10 \text{ miles}}{20 \text{ MIH}}$
 + 1.25 hours
 delay (1.25
 hours per
 round trip
 required for
 unloading
 semitrailers)
 = 2.25 hours

Tons per vehicle (12-ton semitrailers) = 12 short tons

Vehicles available per company = 45

Operational day = 20 hours

Therefore

Companies required =
 $\frac{5,100 \text{ STON} \times 2.25 \text{ hours}}{12 \text{ STON} \times 45 \text{ vehicles} \times 20 \text{ hours}}$
 = 1.06 or 1.1 medium truck companies required

- (b) Movement of 3,600 short tons from Port Alpha to the origin truck terminal:

Daily tonnage = 3,600 short tons

Turnaround time = $\frac{2 \times 10 \text{ miles}}{20 \text{ MIH}}$
 + 1.25 hours
 delay (1.25
 hours per
 round trip
 required for
 loading semi-
 trailers)
 = 2.25 hours

Tons per vehicle (12-ton semitrailer) = 12 short tons

Vehicles available per company = 45

Operational day = 20 hours

Therefore

Companies required =
 $\frac{3,600 \text{ STON} \times 2.25 \text{ hours}}{12 \text{ STON} \times 45 \text{ vehicles} \times 20 \text{ hours}}$
 = .75 or .8 medium truck company required

- (c) Movement of 1,500 short tons from depot 101 to the origin truck terminal:

Daily tonnage = 1,500 short tons

Turnaround time = $\frac{2 \times 5 \text{ miles}}{20 \text{ MIH}}$
 + 1.25 hours
 delay (1.25
 hours per
 round trip
 required for
 loading semi-
 trailers)
 = 1.75 hours

Tons per vehicle (12-ton semitrailer) = 12 short tons

Vehicles available per company = 45

Operational day = 20 hours

Therefore

Companies required =
 $\frac{1,500 \text{ STON} \times 1.75 \text{ hours}}{12 \text{ STON} \times 45 \text{ vehicles} \times 20 \text{ hours}}$
 = .24 or .3 medium truck company required

- (7) *Total medium truck companies required.*

- (a) The total medium truck companies

required for local and line haul tasks are as follows:

13.8 line haul

1.4 destination truck terminal to depot 301

.8 port Alpha to origin truck terminal

.3 depot 101 to origin truck terminal

16

(b) Thus 16 medium truck companies are required to accomplish all tasks for which medium truck companies have been selected. In this operation, the workload is shared among 16 medium truck companies, since all are connected with the semi-trailer relay operation. Therefore, the fractional part of the unit requirement for each task is retained and included in the total and the total is then rounded off to the next higher number of units. However, where the workload cannot be shared among units accomplishing varied tasks, the unit requirement for each task must be rounded off to the next higher whole number. (Each of the medium truck companies requires two semitrailers per tractor since all units will be involved in semitrailer relay operations.)

(8) *Light truck companies required.* Computation of the number of light truck companies required for the movement of 2,400 short tons daily from Red Beach to depot 101:

Daily tonnage = 2,400 short tons

Turnaround time = 2×15

20 MIH

+ 2.5 hours delay (2.5 hours per round trip for loading and unloading straight trucks)

= 4 hours

Tons per vehicle (2½-ton truck)

= 4 short tons

Vehicles available per company=45

Operational day = 20 hours

Therefore

Companies required =
 $\frac{2,400 \text{ STON} \times 4}{4 \text{ STON} \times 45 \text{ vehicles} \times 20 \text{ hours}}$

= 2.7 or 3 light truck companies required

(9) *Control units required.* Based on the preceding computations, 16 medium truck companies and 3 light truck companies are required for the operation. In addition, four teams (team GA, TOE 55-500) are required to man the two trailer transfer points and the transfer operations in the truck terminals. For command and control of these units, four motor transport battalions and one motor transport group are required. (See FM 101-10-2, for basis of allocation.) The group commander has overall responsibility for the operation and assigns a specific geographic area to each battalion. The responsibility for operating each truck terminal is assigned to a specific battalion.

63. Collection of Operational Data

In planning for an operation, reliance must be placed on limited facts, broad planning factors, and assumptions. Planning can be refined by the application of data gathered once the operation has begun. Therefore, operating units must immediately begin to collect such data. A uniform system for collecting and reporting data should be established for motor transport operating units and any other units that may have arrived in the area earlier. Data to be collected can be divided into two areas: unit operating data and highway and terrain data.

a. Unit operating data to be collected include, but are not limited to, the following information:

- (1) The average load per vehicle by type and the tonnage moved by units in specific periods of time.
- (2) The time required to move between specific points; delay time including loading, unloading, relay, transfer,

and servicing; and the time required for administrative and logistical support.

- (3) The average rate of march attainable (by type of vehicle) on specific routes and sections of routes.
- (4) Maintenance data, to include vehicle downtime, vehicle availability, component life, fuel and lubricant consumption, and problems peculiar to the area.
- (5) The percentages of utilization for units and vehicles.
- (6) The incidence and causative factors of accidents and losses sustained from accidents.

b. Highway and terrain data to be collected include the following information:

- (1) General route characteristics. (Much

of this information may be provided by engineer route reconnaissance reports. However, motor transport operating units can collect and develop other supplemental data that directly affect operations, such as distances between points, feasible loads per vehicle, types of vehicles suitable and width of the roadway as it permits or prohibits two-way traffic.)

- (2) Effect of weather and enemy action on the road net.
- (3) Information regarding the impact of civilian traffic and other military traffic on the road net.
- (4) General characteristics of terrain, including trafficability, gradients, natural obstacles, and the effect of weather on trafficability.

CHAPTER 8

MOTOR TRANSPORT SUPPORT IN THEATERS

Section I. BASIC ORGANIZATION AND EQUIPMENT

64. General

A mix of task vehicles by type may be authorized by company tables of organization and equipment when a limited recurring requirement for more than one type of task vehicle can be anticipated in the unit's normal area of operations. In the battalion area of operations, such requirements are generally met by the assignment of companies of varying types. Current tables of organization and equipment, which reflect detailed changes demanded by the introduction of new equipment and techniques, should be used in conjunction with this manual. All references to the field army in this chapter are to the type field army, which may change in size and composition from time to time.

65. Basic Organization

a. Motor transport unit organization is functional. Functions common to all units, regardless of type or size, are therefore reflected by similar subdivisions. Each unit consists of a headquarters element, which includes personnel who control or assist in controlling the unit and who provide administrative, supply, and service support; a maintenance element, which provides organizational maintenance services; and appropriate task elements. The task elements. The basic characteristics of these organization and may, in turn, be similarly subdivided into headquarters, maintenance, and task elements. The basic characteristics of these elements and the primary duties and responsibilities normally assigned to key personnel are outlined in (1) through (3) below. Within limits prescribed by higher authority, variations may be made at the discretion of the commander to effect optimum utilization of personnel for the accomplishment of his assigned mission in a specific situation. This com-

mand prerogative must be preserved to the greatest practicable extent at all levels to maintain operational flexibility.

(1) *Headquarters element.* The size of the headquarters element and the allocation of duties and responsibilities to its authorized personnel vary with the complexity of the unit and the variety of its normally assigned tasks. The unit headquarters is normally divided into a command group for control and a service group for administration, supply, and service support. At battalion or higher level, the headquarters element is a headquarters and headquarters detachment (or company). At this level, a staff is provided to assist the commander. Duties and responsibilities of staff personnel are based on the functions of command (FM 101-5). The motor transport company headquarters also contains a command group and a service group though not so subdivided by TOE. A brief description follows:

(a) *Command group.* The primary responsibility of the company commander is the successful performance of the unit's assigned missions under all conditions. He is responsible for training, discipline, control, administration, and welfare of assigned personnel and for security, maintenance, and proper utilization of all authorized equipment. The first sergeant, the truckmaster, the assistant truckmaster, and the dispatcher form the company command group to assist the commander in discharging these responsibilities.

- (b) *Service group.* The service group of the company headquarters provides for the company supply and mess. Major duties of the service group are performed by the supply sergeant and the mess steward.
- (2) *Maintenance element.* The size of the maintenance element, type and amount of equipment, and personnel skill levels are determined by the type and amount of task equipment authorized, assigned, or attached to the unit. The strength of this element in motor transport companies may vary from 12 in the light truck company equipped with 2½-ton trucks to 25 in the medium truck company equipped with cargo semitrailers. Every member of the maintenance platoon or section must be proficient in his MOS and must be thoroughly qualified for his position skill level. The leader of the maintenance element, a warrant officer qualified as an automotive maintenance technician, is the key to efficient, effective maintenance within the company. He is the adviser to the company commander, and he is the functional representative in all maintenance matters. He directs and supervises all activities of the maintenance element and must be an efficient manager, as well as a competent technician. He plans maintenance operations, provides for emergency repairs, and plans the arrangement of tools and equipment to provide efficient service and repair. He is responsible for the preparation of forms, records, and reports showing the status of organizational maintenance. He insures adequate supply and authorized stockage of maintenance items and repair parts through timely requisition and constant control. He also assists the commander in planning the unit maintenance program and preparing the maintenance portion of the unit standing operating procedure. He is responsible for the training of assigned maintenance personnel and for preventive maintenance training for all drivers assigned to the unit.
- (3) *Task elements.* The task elements of the motor transport company are its operating platoons. Each has a small headquarters for centralized operations. The platoons are purely operational and have no organic administrative, supply, or maintenance personnel; when a platoon is operating independently for an extended period, such personnel may be attached. The leader of each platoon is a command representative of the company commander at the platoon level and, as such, is given certain command responsibilities. He is responsible to the company commander for the training, guidance, and supervision of his platoon in compliance with company policies, orders, and directives. He is assisted by the platoon sergeants and squad leaders. These noncommissioned officers are qualified truckmasters and perform duties in connection with the organization and direction of platoon operations, including the formation and supervision of convoys, the supervision of driver operation and of training in all aspects of motor transport operations. The training of key personnel includes preparation for promotion to the next higher grade.
- b. Each motor transport operating unit discussed in this chapter, except the transportation car company, has, when augmented, the capability of operating two 10-hour shifts per day. Augmentation provides two drivers per task vehicle in each of the light, medium, and light-medium companies, and four drivers per task vehicle in the heavy company.

66. Characteristics of Equipment

a. *General.* The task vehicles authorized for motor transport units vary in type, design, and capabilities according to military transportation requirements and anticipated operational environments. Although tracked cargo carriers may be authorized under special conditions, transportation motor units are nor-

mally equipped with wheeled vehicles. Task equipment and mix of vehicles by type are selected on the basis of many factors of varying importance. This selection is made to some extent at all levels of command—from the assignment of units to a field force to the selection of an individual vehicle for dispatch on a specific task. Factors to be considered include, but are not limited to, the following:

- (1) Environmental factors of climate, weather, and terrain.
- (2) Operational factors such as the road net and highway surface or trafficability.
- (3) Tactical considerations, including possible hostile interference by type and amount.
- (4) Tonnage requirements, types of cargo, and lengths of hauls.
- (5) Availability of vehicles by type.
- (6) Economy of operation.
- (7) Comparative manpower requirements.

b. *Vehicles.* The principal characteristics of current wheeled military transport vehicles are described in (1) through (5) below:

- (1) *Cargo truck, 2½-ton.* The 2½-ton cargo truck is a standard military transport vehicle designed to carry cargo, personnel, or equipment. It is normally employed in local hauls for the support of interrelated activities and for distribution of supplies to using units, but it is also suitable for long-haul operations when highways are poor or when off-road operation may be required. It is more rugged than commercial type vehicles of comparable capacities and has additional off-road capability provided by all-wheel drive. Its on-road rated capacity is 5 tons; for off-road operation, the load should not exceed 2½ tons. Troop seats are provided in the cargo bed, giving the vehicle a troop-carrying capability of 20 combat-equipped soldiers for a short haul. The truck is designed to tow the 1½-ton cargo trailer, which may be loaded to a maximum of 2¼ tons. However, the loaded trailer should not be towed when off-road operation is antici-

pated. When employed in troop movement, the 1½-ton cargo trailer is normally used to carry baggage and equipment of the transported troops. In local cargo hauls, the trailer is seldom used.

- (2) *Cargo truck, 5-ton.* In size, design, and purpose, the 5-ton cargo truck is similar to the 2½-ton truck, but the 5-ton truck is more rugged as it is built with heavier components throughout to carry heavier cargo and high-density cargo. It is organic to artillery and armored units to transport ammunition. The 5-ton truck is assigned to transportation light truck companies of the field army primarily to meet ammunition transportation requirements.
- (3) *Semitrailer, stake, 12 ton.* The 12-ton four-wheel, cargo semitrailer is designed to be towed by the 5-ton truck trailer or a similar vehicle equipped with a fifth wheel. Highway speeds and off-road capabilities are therefore almost completely dependent on the power and traction of the tractor. The semitrailer is designed to be towed over good hard-surfaced roads at speeds as high as 50 miles (80 km) per hour, with loads up to 18 tons; it can be towed over unimproved roads and trails or over open rolling terrain at speeds as high as 30 miles (48) km per hour, with loads up to 12 tons. In planning for employment of this equipment, the truck tractor and semitrailer must be considered as a combination vehicle. This vehicle provides the most economical means of motor transport for long hauls, particularly for trailer relay operations.
- (4) *Gasoline tank semitrailer, 5,000-gallon.* The 5,000-gallon gasoline tank semitrailer is designed for bulk transportation of fuel. Like the cargo semitrailer, it is towed by the 5-ton tractor and can be towed over improved roads at speeds up to 50 miles (80 km) per hour while carrying its full

rated load. It can be towed over unimproved roads and trails of good trafficability while carrying 3,000 gallons of bulk fuel. Bulk handling of fuel saves time and manpower and is used in transporting and dispensing fuels whenever the situation permits. Fuel transported in transportation motor transport gasoline tank semitrailers may be delivered to units on a trailer-exchange basis, transferred directly to user tank vehicles, or transferred to supply point tanks. These vehicles may be used as mobile filling stations or as mobile storage facilities to augment supply point stocks in emergencies.

(5) *Semitrailer, tank transporter, 50-ton, eight-wheel.* The 50-ton tank transporter semitrailer is designed primarily for on-road transportation of the main battle tank and other heavy, oversize, tracked combat vehicles. It may also be used for the transportation of heavy engineer equipment and bulky, overweight or outsized cargo. The 10-ton truck tractor M123 is used as the towing vehicle. Towed speeds are limited to 26 miles (42 km) per hour on improved roads; off-road operation is not recommended. Because of the large size and weight of this vehicle, careful coordination is required through appropriate traffic headquarters for highway movement.

Section II. TASK UNITS

67. Transportation Light Truck Company (TOE 55-17)

a. Organization. The transportation light truck company consists of a company headquarters, a maintenance section, and three truck platoons. Each truck platoon is organized with a platoon headquarters and two truck squads.

b. Assignment. Transportation light truck companies are assigned to a field army, a corps, or a logistical command. They are normally attached to a headquarters and headquarters detachment, transportation motor transport battalion (TOE 55-16). Five transportation light truck companies normally support the type field army. These companies are attached to the transportation motor transport group of the transportation brigade. One transportation light truck company equipped with 2½-ton trucks is attached to each rear transportation truck battalion, and one equipped with 5-ton task vehicles is attached to each forward truck battalion. In the communications zone, light truck companies are allocated as required for terminal clearance, depot operations, and installation support.

e. Equipment. Task equipment for the transportation light truck company consists of 60 trucks (either 2½-ton or 5-ton), six of which

are equipped with winches, and 18 1½-ton trailers (60 when authorized by the theater of operations commander). Each truck squad has 10 trucks. The company is also authorized tool sets and equipment adequate for the performance of organizational maintenance; communications for command control, weapons for defense and security, and mess equipment and other standard items of issue for the administration and operation of the unit in the field.

d. Capabilities (tables V and VI). For long-range planning purposes, the capabilities of the transportation light truck company are figured on the basis of 75-percent vehicle availability, four round trips daily for local hauls or two round trips daily for line hauls, and 4 short tons of cargo per 2½-ton truck or 6-10 short tons (based on cargo density) per 5-ton truck. Passenger capacities are figured at 20 per truck for both 2½-ton and 5-ton vehicles for short hauls or, for long hauls, 16 per 2½-ton truck and 18 per 5-ton truck. Actual vehicle availability varies with age and condition of assigned task vehicles, state of training of the unit, and effectiveness of the maintenance program. The number of trips daily varies with changes in the operational environment. Other factors influencing total daily lift capability of the company are average cargo

density, degree of cargo space utilization, availability of materials handling equipment at

loading and unloading points, and availability of vehicle fuels and lubricants.

*Table V. Transportation Light Truck Company, Determination of Capabilities—
Local Haul (15 Miles Forward).*

	Optimum norm		Maximum sustained	
	2½-ton trk	5-ton trk	2½-ton trk	5-ton trk
Planning factors:				
Short tons per vehicle.....	4	6	5	10 ²
Passengers per vehicle.....	20	20	20	20
Rate of movement (MIH).....	15	15	20	20
Load and unload (cargo) (hrs per trip).....	2.5	2.5	2.5	2.5
Load and unload (passengers) (hrs per trip).....	1	1	1	1
Trips per day (cargo).....	4	4	6	6
Trips per day (passenger).....	6	6	8	8
Vehicle availability.....	45 (75%)	45 (75%)	50 (83%)	50 (83%)
Capabilities:				
Optimum norm (long-range planning):				
2½-ton trucks:				
45 vehicles × 4 short tons × 4 trips	=	720 short tons daily		
45 vehicles × 20 passengers × 6 trips	=	5,400 passengers daily		
5-ton trucks:				
45 vehicles × 6 short tons × 4 trips	=	1,080 short tons daily		
45 vehicles × 20 passengers × 6 trips	=	5,400 passengers daily		
Maximum sustained (short-range planning) ¹ :				
2½-ton trucks:				
50 vehicles × 5 short tons × 6 trips	=	1,500 short tons daily		
50 vehicles × 20 passengers × 8 trips	=	8,000 passengers daily		
5-ton trucks:				
50 vehicles × 10 short tons × 6 trips	=	3,000 short tons daily		
50 vehicles × 20 passengers × 8 trips	=	8,000 passengers daily		

¹ To be used for planning for 30 days or less; for longer periods or unusual conditions, use optimum norm and/or degradation factors.

² Load density of 37 pounds per cubic foot required to meet tonnage indicated.

*Table VI. Transportation Light Truck Company, Determination of Capabilities—
Line Haul (100 Miles Forward)*

	Optimum norm		Maximum sustained	
	2½-ton trk	5-ton trk	2½-ton trk	5-ton trk
Planning factors:				
Short tons per vehicle.....	4	6	5	10 ²
Passengers per vehicle.....	16	18	16	18
Rate of movement (MIH).....	15	15	20	20
Load and unload (cargo) (hrs per trip).....	2.5	2.5	2.5	2.5
Load and unload (passengers) (hrs per trip).....	1	1	1	1
Trips per day (cargo).....	1.5	1.5	2	2
Trips per day (passenger).....	1.5	1.5	2	2
Vehicle availability.....	45 (75%)	45 (75%)	50 (83%)	50 (83%)
Capabilities:				
Optimum norm (long-range planning):				
2½-ton trucks:				
45 vehicles × 4 short tons × 1.5 trips	=	270 short tons daily		
45 vehicles × 16 passengers × 1.5 trips	=	1,080 passengers daily		
5-ton trucks:				
45 vehicles × 6 short tons × 1.5 trips	=	405 short tons daily		
45 vehicles × 18 passengers × 1.5 trips	=	1,215 passengers daily		
Maximum sustained (short-range planning) ¹ :				
2½-ton trucks:				
50 vehicles × 5 short tons × 2 trips	=	500 short tons daily		
50 vehicles × 16 passengers × 2 trips	=	1,600 passengers daily		

Table VI. *Transportation Light Truck Company, Determination of Capabilities—
Line Haul (100 Miles Forward)—Continued*

	Optimum norm		Maximum sustained	
	2½-ton trk	5-ton trk	2½-ton trk	5-ton trk
5-ton trucks:				
50 vehicles × 10 short tons × 2 trips	= 1,000 short tons, daily			
50 vehicles × 18 passengers × 2 trips	= 1,800 passengers daily			

¹ To be used for planning for 30 days or less; for longer periods or unusual conditions, use optimum norm and/or degradation factors.

² Load density of 37 pounds per cubic foot required to meet tonnage indicated.

e. *Employment.* In a theater of operations, light truck companies are employed to fill commitments for the movement of troops within the army area and for local haul of supplies and ammunition; they also accomplish the same missions in the communications zone and in addition provide a general hauling service, as required, for terminal clearance, depot operations, and installation support. Light truck companies provide flexibility in the choice of vehicles for specific tasks. Employment of 5-ton trucks is normally restricted to the transportation of high-density cargo such as ammunition, though personnel may be carried when necessary. The 2½-ton trucks are used in transporting rations and other low-density cargo and in transporting personnel as required. The off-road mobility of both light trucks may indicate their choice over the more economical though less mobile, medium trucks.

68. Transportation Medium Truck Company (Cargo) (TOE 55-18)

The transportation medium truck company (cargo) is organized for the most economical highway movement of bulk dry cargo in theaters of operation. In an emergency, task equipment of the company can be employed for transportation of personnel. Although the off-road operational mobility of the company is restricted by task vehicle limitations, this advantage is offset by the company's one-time lift capacity and its relay operation capability. The transportation medium truck company (cargo) is equipped with cargo semitrailers when it is employed in its principal role of transporting general cargo. This company may be equipped with refrigerator semitrailers to accomplish specialized requirements for movement of perishable subsistence and other cargo that require the maintenance of prescribed temperature levels during transport (FM 10-

60). The company may be augmented with a missile transport squad to accomplish specialized missile transport requirements.

a. *Organization.* The transportation medium truck company (cargo) is organized with a company headquarters, a maintenance platoon, and three truck platoons. Each truck platoon consists of a platoon headquarters and two truck squads.

b. *Assignment.* Transportation medium truck companies (cargo) are assigned to a field army, a corps, or a logistical command. They are normally attached to a headquarters and headquarters detachment, transportation motor transport battalion (TOE 55-16). Four transportation medium truck companies normally support the type field army. These are attached to the motor transport group of the transportation brigade: two to each rear transportation truck battalion. In the communications zone, these companies are allocated on the basis of general combat service support requirements in support of the transportation intersectional service and in support of organizations that can profitably use a high-volume, long-haul trucking service.

c. *Equipment.* The transportation medium truck company is authorized sixty 5-ton truck tractors and sixty 12-ton cargo semitrailers. Units engaged in semitrailer relay operations may be authorized an additional 60 semitrailers by the theater commander. Tool sets and maintenance equipment for normal organizational maintenance, communications for command and control, weapons for security and defense, and mess equipment and other standard items necessary for administration and operation in the field are also authorized by tables of organization and equipment. Additional or substitute equipment indicated by operational conditions may be authorized by the theater commander.

d. *Capabilities (tables VII and VIII).* For long-range planning purposes, the capabilities of the company are figured on the basis of 75-percent vehicle availability, four round trips daily for local hauls or two round trips daily (one per 10-hour shift) for line hauls, and 12 short tons of cargo per semitrailer. Passenger capacities are figured at 50 passengers per vehicle. The unit is considered to be at full strength for planning purposes. On this basis, the company can transport 2,160 short tons daily in local hauls or 1,080 short tons daily in line hauls. Tonnage capabilities for short range planning—operations of 30 days or less over good roads—may be increased to 5,400 short tons daily. In order to achieve the latter figure, the rate of movement is increased from 15 to 20 miles (24 to 32 km) in the hour; short tons per vehicle, from 12 to 18; and trips per day, from four to six. Vehicle availability is also increased to 83 percent. This maximum sustained tonnage capability can be obtained only on good roads, in good weather, with excellent maintenance, and with well-trained troops. Although the combination task vehicle is normally considered an economical on-road cargo carrier, its off-road capabilities may be greatly improved by the substitution of desert tires. This additional traction for the prime mover and the increased flotation of both tractor and semitrailer provide acceptable off-road mobility for extended desert operations and for limited cross-country operations in other areas.

e. *Employment.* The transportation medium truck company is employed in a theater of operations for economical transportation of bulk dry cargo in line-haul operations from initial points of entry into the theater as far forward into the army area as possible. In the army area, medium truck companies operate from army rear to the general support and direct support activities in the corps areas as a part of the system operated by the transportation brigade. This system is coordinated with intersectional transportation elements of communications zone and complements the motor transport capabilities of support brigades and units of other army-wide services.

69. Transportation Medium Truck Company (Petroleum) (TOE 55-18)

a. *Organization.* The transportation medium truck company (petroleum) is organized with a company headquarters, a maintenance platoon, and three truck platoons, each with a platoon headquarters and two truck squads. In personnel assignment and strength, it is identical to the transportation medium truck company (cargo).

b. *Assignment.* Transportation medium truck companies (petroleum) are assigned to a field army, a corps, or a logistical command. They are normally attached to a headquarters and headquarters detachment, transportation motor transport battalion (TOE 55-16). Six transportation medium truck companies (petroleum)

Table VII. Transportation Medium Truck Company, Determination of Capabilities—
Local Haul (15 Miles Forward)

	Optimum 12-ton S&P	norm 7½-ton reefer	Maximum 12-ton S&P	sustained ¹ 7½-ton reefer
Planning factors:				
Short tons per vehicle.....	12	7.5	18	7.5
Passengers per vehicle.....	50	NA	50	NA
Rate of movement (MIH).....	15	15	20	20
Load and unload (cargo) (hrs per trip).....	2.5	2.5	2.5	2.5
Load and unload (passengers) (hrs per trip).....	1	NA	1	NA
Trips per day (cargo).....	4	4	6	5
Trips per day (passenger).....	6	NA	8	NA
Vehicle availability.....	45 (75%)	45 (75%)	50 (83%)	50 (83%)
Capabilities:				
Optimum norm (long-range planning):				
12-ton stake and platform:				
45 vehicles × 12 short tons × 4 trips	= 2,160 short tons daily			
45 vehicles × 50 passengers × 6 trips	= 13,500 passengers daily			
7½-ton refrigerator:				
45 vehicles × 7.5 short tons × 4 trips	= 1,350 short tons daily			

*Table VII. Transportation Medium Truck Company, Determination of Capabilities—
Local Haul (15 Miles Forward)—Continued*

	<i>Optimum</i> <i>12-ton S&P</i>	<i>norm</i> <i>7½-ton reefer</i>	<i>Maximum</i> <i>12-ton S&P</i>	<i>sustained</i> ¹ <i>7½-ton reefer</i>
Maximum sustained (short-range planning) ¹ :				
12-ton stake and platform:				
50 vehicles × 18 short tons × 6 trips	=	5,400 short tons daily		
50 vehicles × 50 passengers × 8 trips	=	20,000 passengers daily		
7½-ton refrigerator:				
50 vehicles × 7.5 short tons × 6 trips	=	2,250 short tons daily		

¹To be used for planning for 30 days or less; for longer periods or unusual conditions, use optimum norm and/or degradation factors.

*Table VIII. Transportation Medium Truck Company, Determination of Capabilities—
Line Haul (100 Miles Forward).*

	<i>Optimum</i> <i>12-ton S&P</i>	<i>norm</i> <i>7½-ton reefer</i>	<i>Maximum</i> <i>12-ton S&P</i>	<i>sustained</i> ¹ <i>7½-ton reefer</i>
Planning factors:				
Short tons per vehicle-----	12	7.5	18	7.5
Passengers per vehicle-----	50	NA	50	NA
Rate of movement (MIH)-----	15	15	20	20
Load and unload (cargo) (hrs per trip)-----	2.5	2.5	2.5	2.5
Load and unload (passengers) (hrs per trip)-----	1	NA	1	NA
Trips per day (cargo)-----	1.5	1.5	2	2
Trips per day (passenger)-----	1.5	NA	2	NA
Vehicle availability-----	45 (75%)	45 (75%)	50 (83%)	50 (83%)
Capabilities:				
Optimum norm (long-range planning):				
12-ton stake and platform:				
45 vehicles × 12 short tons × 1.5 trips	=	810 short tons daily		
45 vehicles × 50 passengers × 1.5 trips	=	3,375 passengers daily		
7½-ton refrigerator:				
45 vehicles × 7.5 short tons × 1.5 trips	=	506 short tons daily		
Maximum sustained (short-range planning) ¹ :				
12-ton stake and platform:				
50 vehicles × 18 short tons × 2 trips	=	1,800 short tons daily		
50 vehicles × 50 passengers × 2 trips	=	5,000 passengers daily		
7½-ton refrigerator:				
50 vehicles × 7.5 short tons × 2 trips	=	750 short tons daily		

¹To be used for planning for 30 days or less; for longer periods or unusual conditions, use optimum norm and/or degradation factors.

um) normally support the type field army. Three are attached to each petroleum battalion (general support group) operating in the army service area, based on the policy of direct assignment of bulk fuel transportation to the commander having responsibility for bulk petroleum supply and distribution. This policy also applies to the allocation of transportation medium truck companies (petroleum) in the communications zone, the number of companies allocated depending on the requirements for POL delivery by motor transportation in the particular theater of operations.

c. Equipment. The transportation medium truck company (petroleum) is authorized sixty

5,000-gallon gasoline tank semitrailers with sixty 5-ton truck tractors as prime movers. In addition, the company is authorized tool sets and maintenance equipment, communications equipment, mess equipment, weapons for security and defense, and standard items necessary for administration and operation in the field.

d. Capabilities (tables IX and X). Long-range planning capabilities of the transportation medium truck company (petroleum) are based on the assumption of 75-percent vehicle availability, four round trips daily for local hauls or two round trips daily (one per 10-hour shift) for line hauls, and 5,000 gallons

of liquid cargo per semitrailer. On this basis, assuming the unit to be at full strength, the company is capable of moving 900,000 gallons of fuel per day in local-haul operations and 450,000 gallons in line-haul operations. The safety factors included in the assumptions for long-range operations may be reduced to meet specific requirements. For operations of 30 days or less, maintenance planning backed by skillful, well-directed maintenance personnel can increase vehicle availability to 83 percent—from 45 to 50 vehicles. On good highways, with an adequate road net, speeds can be increased to achieve 20 miles (32 km) in the hour rather than 15 (24 km). The number of local-haul trips per day can thus be increased to six. A maximum sustained capability of 1,500,000 gallons per day in local hauls can be considered feasible under these conditions. By applying the same assumptions to line haul operations, capability is increased to 500,000 gallons for 100 miles (160 km) forward. Extended off-road operations cannot be considered for the company unless trafficability is unusually good.

e. Employment. The capabilities of the transportation medium truck company (petroleum) clearly indicate its general employment in both the field army and the communications zone. The six companies in the army rear general support groups provide the capability for line haul and local delivery of bulk petroleum. The transportation medium truck companies (petroleum) make bulk delivery from the army-

operated facilities as far forward as the situation permits—at least as far forward as the supply points operated by the petroleum supply companies in the corps area and, if possible, to supply and service battalions assigned to direct support groups operating in the corps areas and to division support commands. This procedure eliminates unnecessary transfer of product and speeds distribution to the user. In normal operations, the transportation medium truck company (petroleum) is employed in long-haul transport of bulk fuel from initial points of entry into a theater to points in the communications zone and the army area, based on the overall POL distribution plan for the theater.

70. Transportation Light-Medium Truck Company (TOE 55-67)

The transportation light-medium truck company is essentially a light truck company (2½-ton trucks) augmented by one medium truck squad (5-ton tractors with 12-ton semitrailers). This addition gives the company an organic capability to provide transportation for all classes of supply, except bulk class III, within the army area in combat support and combat service support operations.

a. Organization. The transportation light-medium truck company is organized with a company headquarters, a maintenance section, and three operating platoons: two light truck platoons and one light-medium truck platoon,

Table IX. Transportation Medium Truck Company (5,000-Gallon), Determination of Capabilities—Local Haul (15 Miles Forward)

	Optimum norm	Maximum sustained ¹
Planning factors:		
Gallons per vehicle.....	5,000	5,000
Passengers per vehicle.....	NA	NA
Rate of movement (MIH).....	15	20
Load and unload (cargo) (hrs per trip).....	2.5	2.5
Load and unload (passengers).....	NA	NA
Trips per day (cargo).....	4	6
Trips per day (passenger).....	6	8
Vehicle availability	45 (75%)	50 (83%)
Capabilities:		
Optimum norm (long-range planning):		
45 vehicles × 5,000 gallons × 4 trips	=	900,000 gallons daily
Maximum sustained (short-range planning) ¹ :		
50 vehicles × 5,000 gallons × 6 trips	=	1,500,000 gallons daily

¹To be used for planning for 30 days or less; for longer periods or unusual conditions, use optimum norm and/or degradation factors.

Table X. Transportation Medium Truck Company (5,000-gallon), Determination of Capabilities—Line Haul (100 Miles Forward)

	Optimum norm	Maximum sustained ¹
Planning factors:		
Gallons per vehicle.....	5,000	5,000
Passengers per vehicle.....	NA	NA
Rate of movement (MIH).....	15	20
Load and unload (cargo) (hrs per trip).....	2.5	2.5
Load and unload (passengers).....	NA	NA
Trips per day (cargo).....	1.5	2
Trips per day (passenger).....	NA	NA
Vehicle availability	45 (75%)	50 (83%)
Capabilities:		
Optimum norm (long-range planning):		
45 vehicles × 5,000 gallons × 1.5 trips	= 337,500 gallons daily	
Maximum sustained (short-range planning) ¹ :		
50 vehicles × 5,000 gallons × 2 trips	= 500,000 gallons daily	

¹To be used for planning for 30 days or less; for longer periods or unusual conditions, use optimum norm and/or degradation factors.

which is a three-squad platoon with two light truck squads and one medium truck squad.

b. Assignment. Transportation light-medium truck companies are assigned to a field army support command, a corps support brigade, or a logistical command. They are normally attached to a supply and service battalion, a transportation general support battalion, or a transportation motor transport battalion. Twenty-four transportation light-medium truck companies normally support the type field army: two are attached to each forward transportation truck battalion of the transportation brigade, a total of six; one is attached to each supply and service battalion in the direct support and general support groups, a total of eighteen.

c. Equipment. The transportation light-medium truck company is authorized sixty 2½-ton trucks with sixty 1½-ton cargo trailers and ten 5-ton truck tractors with twenty 12-ton semitrailers as task equipment. In addition to its task equipment, the company is authorized vehicles and equipment to carry out the functions of command, control, maintenance, supply, mess, and administration.

d. Capabilities (tables XI and XII). The light-medium truck company has the total lift capability of the light truck company (2½-ton), plus that of one medium truck squad; this lift capability is restricted or modified by operational conditions (paras 67 and 68). The authorization of truck tractors and semitrail-

ers in the ratio of 1 to 2 gives the unit a trailer relay capability or a limited capability of mobile storage. The assignment of two drivers for each task vehicle provides the unit with a capability for around-the-clock operations (two 10-hour shifts). For long-range planning, based on the assumption of 75-percent vehicle availability with the unit at full strength (eight 12-ton stake and platform semitrailers available), this company can transport 276 short tons of general cargo in one lift.

e. Employment. The transportation light-medium truck company provides a flexible responsive motor transport unit for employment by the commanders of forward transportation truck battalions and of supply and service battalions in both direct support and general support groups. This unit is primarily required to move dry cargo in comparatively small shipments over limited distances. This requirement is met by the six light truck (2½-ton) squads in the company. The incorporation of the medium squad with its tractor-trailer combination vehicles meets the limited requirements for long-haul transport in the assigned areas of responsibility. This medium truck squad may also be employed in short-haul operations for economical transport of larger bulk shipments. Light-medium truck companies in the transportation brigade are employed by the forward transportation truck battalions as utility motor transport in performing the bri-

Table XI. Transportation Light-Medium Truck Company, Determination of Capabilities—Local Haul (15 Miles Forward)

	<i>Optimum norm</i>		<i>Maximum sustained ¹</i>	
	<i>2½-ton trk</i>	<i>12-ton S&P</i>	<i>2½-ton trk</i>	<i>12-ton S&P</i>
Planning factors:				
Short tons per vehicle.....	4	12	5	18
Passengers per vehicle.....	20	50	20	50
Rate of movement (MIH).....	15	15	20	20
Load and unload (cargo) (hrs per trip).....	2.5	2.5	2.5	2.5
Load and unload (passengers) (hrs per trip).....	1	1	1	1
Trips per day (cargo).....	4	4	6	6
Trips per day (passenger).....	6	6	8	8
Vehicle availability	45 (75%)	7 (70%)	50 (83%)	8 (80%)

Capabilities:

Optimum norm (long-range planning):

2½-ton trucks:

45 vehicles × 4 short tons × 4 trips = 720 short tons daily
 45 vehicles × 20 passengers × 6 trips = 5,400 passengers daily

12-ton stake and platform:

7 vehicles × 12 short tons × 4 trips = 336 short tons daily
 7 vehicles × 50 passengers × 6 trips = 2,100 passengers daily

Maximum sustained (short-range planning)¹:

2½-ton trucks:

50 vehicles × 5 short tons × 6 trips = 1,500 short tons daily
 50 vehicles × 20 passengers × 8 trips = 8,000 passengers daily

12-ton stake and platform:

8 vehicles × 18 short tons × 6 trips = 864 short tons daily
 8 vehicles × 50 passengers × 8 trips = 3,200 passengers daily

¹To be used for planning for 30 days or less; for longer periods or unusual conditions, use optimum norm and/or degradation factors.

Table XII. Transportation Light-Medium Truck Company, Determination of Capabilities—Line Haul (100 Miles Forward)

	<i>Optimum norm</i>		<i>Maximum sustained ¹</i>	
	<i>2½-ton trk</i>	<i>12-ton S&P</i>	<i>2½-ton trk</i>	<i>12-ton S&P</i>
Planning factors:				
Short tons per vehicle.....	4	12	5	18
Passengers per vehicle.....	16	50	16	50
Rate of movement (MIH).....	15	15	20	20
Load and unload (cargo) (hrs per trip).....	2.5	2.5	2.5	2.5
Load and unload (passengers) (hrs per trip).....	1	1	1	1
Trips per day (cargo).....	1.5	1.5	2	2
Trips per day (passenger).....	1.5	1.5	2	2
Vehicle availability	45 (75%)	7 (70%)	50 (83%)	8 (80%)

Capabilities:

Optimum norm (long-range planning):

2½-ton trucks:

45 vehicles × 4 short tons × 1.5 trips = 270 short tons daily
 45 vehicles × 16 passengers × 1.5 trips = 1,080 passengers daily

12-ton stake and platform:

7 vehicles × 12 short tons × 1.5 trips = 126 short tons daily
 7 vehicles × 50 passengers × 1.5 trips = 525 passengers daily

Maximum sustained (short-range planning)¹:

2½-ton trucks:

50 vehicles × 5 short tons × 2 trips = 500 short tons daily
 50 vehicles × 16 passengers × 2 trips = 1,600 passengers daily

12-ton stake and platform:

8 vehicles × 18 short tons × 2 trips = 288 short tons daily
 8 vehicles × 50 passengers × 2 trips = 800 passengers daily

¹To be used for planning for 30 days or less; for longer periods or unusual conditions, use optimum norm and/or degradation factors.

gade mission and in reinforcing the direct support and general support group transport capability as required. The two light-medium truck companies in a forward transportation truck battalion can lift one brigade (nine companies) of infantry when employed in a combat support role. Those attached to direct support supply and service battalions are employed to provide motor transport for all direct support group operations—primarily for unit distribution of supplies other than class III and for displacement of the group. These companies are also employed for the transportation of personnel and for the evacuation of materiel. The companies of the general support battalions are employed for the hauling of supplies or personnel within the group, for supply distribution, for group displacement, and for the evacuation of materiel as required.

71. Transportation Heavy Truck Company (TOE 55-28)

The transportation heavy truck company is organized and equipped to satisfy the military requirements for highway transportation of overweight and outsize loads, primarily the main battle tank and other combat vehicles. The heavy-lift capabilities of the company are also utilized in the movement of heavy engineer equipment and overweight, bulky general cargo.

a. Organization. The company is organized with a company headquarters, a maintenance section, and three truck platoons, each having a platoon headquarters and two truck squads. A driveaway platoon is authorized as augmentation.

b. Assignment. Transportation heavy truck companies are assigned to a field army, a corps, or a logistical command. They are normally attached to a headquarters and headquarters detachment, transportation motor transport battalion (TOE 55-16). Within the field army, a transportation heavy truck company is attached to the forward truck battalions of the transportation brigade and a transportation heavy truck squad to the rear truck battalions. This allocation satisfies the anticipated heavy-lift requirements for highway transportation services in the field army serv-

ice area. In the communications zone, authorization of transportation heavy truck companies is based on requirements for heavy-lift, on-road transport capabilities.

c. Equipment. Major task equipment authorized the transportation heavy truck company by TOE 55-28 consists of 24 tank transporter semitrailers and 24 truck tractors. The 10-ton truck tractor authorized is equipped with dual winches of suitable capacity to load disabled combat vehicles on the semitrailer without the assistance of other equipment. The eight-wheel, 50-ton tank transporter semitrailer is designed to facilitate the loading and transport of either operable or inoperable main battle tanks. Axle loadings are distributed to permit movement over standard improved highways and bridges of class 80 or over. The maximum allowable towed speed for the loaded combination is 26 miles (42 km) per hour on improved roads. The size and weight of the loaded vehicle, combined with its limited speeds, restrict its normal use to the specific purposes for which it was designed. In addition to the task vehicles described, the company is authorized vehicles and equipment necessary to the functions of command, control, maintenance, supply, mess, and administration.

d. Capabilities (tables XIII and XIV). For long-range planning, a vehicle availability of 75 percent is assumed. Local-haul capabilities, with an expected mileage of 15 miles (24 km) forward, would be only three trips daily because of restricted highway speeds and loading times. A total movement of 2,700 short tons is thus the company local-haul capability for long-range planning. For long-haul operations, assuming availability of 18 of the 24 vehicles and a requirement for a forward displacement of cargo 100 miles (160 km), the company capability is 900 short tons daily. This figure represents a reduction of trips from two to one and an increase in tonnage per vehicle from 40 to 50 short tons. Highway alignment (both in curvature and grades) and usable road widths influence the performance of company task elements. The capabilities of the heavy truck squad are proportionate to its authorization of personnel and equipment.

e. Employment. The transportation heavy

Table XIII. Transportation Heavy Truck Company, Determination of Capabilities—Local Haul (15 Miles Forward)

	<i>Optimum norm</i>	<i>Maximum sustained ¹</i>
Planning factors:		
Short tons per vehicle.....	50	50 ²
Passengers per vehicle.....	NA	NA
Rate of movement (MIH).....	10	15
Load and unload (cargo) (hrs per trip).....	2.5	2.5
Load and unload (passengers).....	NA	NA
Trips per day (cargo).....	3	4
Trips per day (passenger).....	NA	NA
Vehicle availability	18 (75%)	20 (83%)
Capabilities:		
Optimum norm (long-range planning):		
18 vehicles × 50 short tons × 3 trips	=	2,700 short tons daily
Maximum sustained (short-range planning) ¹ :		
20 vehicles × 50 short tons × 4 trips	=	4,000 short tons daily

¹To be used for planning for 30 days or less; for longer periods or unusual conditions, use optimum norm and/or degradation factors.

² 50 short tons or main battle tank is maximum design capacity.

Table XIV. Transportation Heavy Truck Company, Determination of Capabilities—Line Haul (100 Miles Forward)

	<i>Optimum norm</i>	<i>Maximum sustained ¹</i>
Planning factors:		
Short tons per vehicle.....	50	50 ²
Passengers per vehicle.....	NA	NA
Rate of movement (MIH).....	10	15
Load and unload (cargo) (hrs per trip).....	2.5	2.5
Load and unload (passengers).....	NA	NA
Trips per day (cargo).....	1	1.5
Trips per day (passenger).....	NA	NA
Vehicle availability	18 (75%)	20 (83%)
Capabilities:		
Optimum norm (long-range planning):		
18 vehicles × 50 short tons × 1 trip	=	900 short tons daily
Maximum sustained (short-range planning) ¹ :		
20 vehicles × 50 short tons × 1.5 trips	=	1,500 short tons daily

¹To be used for planning for 30 days or less; for longer periods or unusual conditions, use optimum norm and/or degradation factors.

² 50 short tons or main battle tank is maximum design capacity.

truck companies of the forward truck battalions are employed to transport heavy equipment from general support to direct support level in the corps areas and to divisions of the corps. The heavy truck company is also utilized in the evacuation of disabled heavy equipment to the rear. The heavy truck squads of the rear truck battalions are normally employed to transport heavy equipment from army reserves to forward areas as required. Heavy truck companies in the communications zone are employed when there is a requirement for on-road movement of heavy-lift or outsize equipment.

72. Transportation Car Company, Army, Logistical Command, or Airborne Corps (TOE 55-19)

a. Organization. The transportation car company is provided with a highly flexible organization to meet a variety of requirements.

- (1) The airborne corps car company is organized with a company headquarters; a maintenance section; a parachute platoon consisting of a platoon headquarters and two parachute squads; and an airborne composite platoon and an airborne ¾-ton pla-

toon, each consisting of a platoon headquarters and two airborne squads. The task vehicles of the parachute squads are $\frac{1}{4}$ -ton trucks. Those of the airborne composite squad are 50 percent $\frac{1}{4}$ -ton trucks with trailers and 50 percent $\frac{3}{4}$ -ton trucks, and those of the airborne $\frac{3}{4}$ -ton platoon are $\frac{3}{4}$ -ton trucks. In support of airborne operations, the parachute platoon is normally employed with the drop elements and landed by parachute; the other two platoons are moved to the overhead with the followup elements and are air-landed. All personnel in the parachute platoon are jump-qualified.

- (2) The army or logistical command car company has the same organization as the airborne corps car company except that a sedan platoon is substituted for the parachute platoon and a $\frac{1}{4}$ -ton truck platoon for the airborne composite platoon. The company is equipped with three basic items of equipment: the $\frac{1}{4}$ -ton truck, the $\frac{3}{4}$ -ton truck, and the sedan. Each is capable of satisfying the requirements of a different type of situation. When all three items of equipment are represented in the company, it is capable of performing three types of missions: the sedan gives the company the capability of transporting military personnel over improved roads in an extensive area; the $\frac{1}{4}$ -ton truck is a command and reconnaissance vehicle suitable for cross-country work; the $\frac{3}{4}$ -ton truck has a cargo- and personnel-carrying capability in addition to that of command and reconnaissance. When one type of mission is likely to be predominant, the company may be organized accordingly. Therefore, it may at times be equipped with sedans, or $\frac{1}{4}$ -ton trucks, or $\frac{3}{4}$ -ton trucks, or any combination thereof.
- (3) When assigned to a field army support command or to a corps support

brigade, the car company is augmented by one additional platoon.

b. Assignment. Transportation car companies are assigned to a field army or a logistical command. They are normally attached to a headquarters and headquarters detachment, transportation motor transport battalion (TOE 55-16). They may be assigned to an independent corps force or to a corps. Normally within the type field army, one car company is attached to each corps support brigade and one is attached to the field army support command. In the communications zone, the company may be attached to the appropriate support headquarters.

c. Equipment. The task vehicles authorized the transportation car company are commercial type sedans, $\frac{1}{4}$ -ton trucks and trailers, and $\frac{3}{4}$ -ton trucks. The vehicle mix, by either company or platoon, may vary to meet a specific operational environment; for example, tactical vehicles for a tactical headquarters with poor highway trafficability or sedans for a headquarters in a better developed and less vulnerable area.

d. Capabilities. A sedan platoon of the transportation car company can transport 75 personnel in one lift. A platoon equipped with $\frac{1}{4}$ -ton trucks and trailers can transport 45 personnel and $2\frac{1}{2}$ -tons of baggage or small-size supplies, or $6\frac{1}{4}$ tons of small-size supplies and cargo, mail, or light commodities, in one lift. A platoon equipped with $\frac{3}{4}$ -ton trucks can transport $11\frac{1}{4}$ tons of cargo or 120 people in one lift. A composite platoon composed of ten $\frac{1}{4}$ -ton trucks and trailers and ten $\frac{3}{4}$ -ton trucks (designated the airborne platoon in the airborne organization) can transport 82 personnel and $7\frac{1}{2}$ tons of baggage or small-size supplies, or 10 tons of small-size supplies and cargo, mail, or light commodities, in one lift. All capabilities are computed on a 75-percent availability of vehicles with all the vehicles carrying their rated capacity. When the transportation car company is organized for an airborne corps, the parachute platoon has the capability of being landed by parachute or aircraft; all personnel in this platoon are airborne qualified.

e. Employment. The transportation car company is employed to transport personnel and light cargo by motor vehicles. The unit is employed by both the logistical command and the field army and is subordinate to the appropriate command. When employed in the field army, the car company may be attached to a transportation motor transport battalion, a transportation brigade or group, or a corps or army headquarters. When employed in the logistical command, the unit may be attached to a transportation motor transport battalion or a transporaion brigade or group.

73. Transportation Cellular Units

a. Transporation Service Organization (TOE 55-500). Motor transport service organizations consisting of the following teams are contained in TOE 55-500: GA, trailer transfer point, operating, and GB, highway regulation point, operating. These teams may be attached to higher echelon units or may operate independently.

b. Composite Service Organization (TOE 29-500). Composite service organization teams

with varying capabilities and personnel strengths are contained in TOE 29-500. The mess detachments and automotive maintenance detachments are utilized to augment motor transport units to permit round-the-clock operations.

74. Transportation Motor Transport Divisional Units (FM 10-50)

Transportation motor transport companies are employed in the supply and transport battalion of the armored division or infantry division (mechanized) (TOE 55-87), the infantry division (TOE 55-88), and the airborne division (TOE 55-97). These motor transport companies are organized and equipped to provide transportation for unit distribution of all classes of supply except class V; to transport the division reserve supplies for which the unit is responsible; and, except for the airborne division, to furnish vehicles required for displacing division headquarters and the division administration company and to supplement means available to other elements of the division.

Section III. COMMAND UNITS

75. Headquarters and Headquarters Detachment, Transportation Motor Transport Battalion (TOE 55-16)

a. Mission. The mission of the headquarters and headquarters detachment, transportation motor transport battalion, is to provide command and supervision to units engaged in all types of motor transport such as direct support of tactical units, port or beach clearance, depot and terminal operations, and line hauls.

b. Assignment. The headquarters and headquarters detachment, motor transport battalion, is assigned to a field army, a corps, or a logistical command and is normally attached to a motor transport group. However, it may be attached to any other organization having a continuous requirement for coordinated administration and operation of motor transport companies.

c. Capabilities. The headquarters and headquarters detachment, motor transport battalion, is capable of commanding and providing

administrative support for three to seven transportation truck and/or tracked vehicle companies. Small units or supporting services, such as ordnance maintenance company or detachment, may be attached when required.

d. Characteristics. The headquarters and headquarters detachment, motor transport battalion, is administratively self-sufficient except for messing. Assigned vehicles are used administratively and for supervisory purposes. No task vehicles are provided. The unit is 40 percent mobile and requires additional vehicles for movement of personnel and equipment in one lift.

e. Functions.

- (1) The battalion headquarters is the command group and includes the commander, his executive and staff, and the sergeant major. The headquarters detachment is the operational group and includes the detachment headquarters and the administration

and personnel, operations, supply, maintenance, and communications sections. Headquarters detachment may be further augmented for personnel administration purposes.

- (2) The headquarters and headquarters detachment, motor transport battalion, plans and schedules tasks to conform with the overall movement program and with operational requirements and supervises, coordinates, and assists subordinate units in administration, supply, maintenance, training, and communications.
- (3) A principal type of operation performed by the headquarters and headquarters detachment, motor transport battalion, is the operation of a truck terminal or trailer relay system, or both of these transportation facilities.

f. Employment. The headquarters and headquarters detachment, motor transport battalion, is employed to provide centralized command, coordination, and supervision to a number of operating units in support of a single command, installation, or area. The type and number of companies attached to the battalion may be varied to suit the operation. In the type field army, battalions are designated as forward battalions or rear battalions, depending upon their mission, and are attached to the transportation brigade (FM 55-9).

76. Headquarters and Headquarters Detachment, Transportation Motor Transport Group (TOE 55-12)

a. Mission. The mission of the headquarters and headquarters detachment, transportation motor transport group, is to provide command, staff planning, and control of operations for transportation motor transport battalions and attached units.

b. Assignment. The headquarters and headquarters detachment, motor transport group, is assigned to a field army, a corps, or a logistical command. It is normally attached to a transportation motor transport command, or it may operate separately. Within the type field army, this unit is normally attached to the transportation brigade of the field army

support command. When operating separately, the group performs its mission under the appropriate transportation authority.

c. Capabilities. The headquarters and headquarters detachment, motor transport group, is capable of commanding three to seven motor transport battalions and assigned or attached units. At full strength it has the following capabilities:

- (1) Supervising and assisting subordinate units in administrative and personnel matters.
- (2) Operational planning for the group.
- (3) Coordinating and supervising operations of subordinate units.
- (4) Supervising and assisting subordinate unit supply and maintenance activities.
- (5) Operating the group electrical communications system, both wire and radio, to subordinate and superior echelons.
- (6) Providing organizational maintenance on organic vehicles and communications equipment.

d. Characteristics. The headquarters and headquarters detachment, motor transport group, is administratively self-sufficient. There are no task vehicles organic to the unit. Assigned transportation is used for administration and supervision only. The unit is 65 percent mobile and requires additional motor transport for movement of personnel and equipment.

e. Functions.

- (1) Group headquarters sections are organized within the headquarters detachment. These sections are under appropriate staff officers assigned to group headquarters. The group headquarters is under the group commander, who is assisted by the executive officer. The staff sections of the motor transport group assist the commander in formulating, interpreting, and disseminating policy and in supervising and direction operations.

(2) Functions of the headquarters and headquarters detachment, motor transport group, include planning, coordinating, and supervising assigned or attached units engaged in port or beach clearance, local or line hauls, and other motor transport missions. A flight support augmentation provides the capability of effective command and control over widely dispersed units.

(a) The group headquarters plans for the most economical and efficient use of motor transport equipment assigned to subordinate units. It makes plans for the most complete and effective use of the highway network. Such plans normally culminate in an operational analysis consisting of a tabulation of tasks for subordinate units, designated routings for supply hauls if necessary, and road movement tables and graphs that fit the schedules of individual units into the overall operation and traffic plan. These procedures form the basis for orders issued to operating units.

(b) In fitting capabilities of assigned units to operational requirements, the group headquarters maintains close coordination with higher headquarters. Coordination is also necessary with the following:

1. The supporting direct support group in obtaining the required supply, issue, and maintenance of equipment.
2. The signal officer in establishing communications.
3. The provost marshal in traffic control matters.
4. The engineer officer for route information, construction, and maintenance.
5. All supporting services in regard to location of depots, supply points, pipeline terminals, access roads to installations, and loading and unloading facilities and capabilities at supply installations.

6. Civil affairs support units for required civilian personnel, facilities, and materiel.

(c) The group headquarters has two responsibilities for training, which in most cases must be carried on simultaneously. Individuals are trained to perform their assigned tasks and, at the same time, the group is trained to supervise the operations and training of attached units. Motor transport battalions and companies are attached to the group during training periods to improve the quality of their training and to give the group headquarters experience in the supervision of subordinate units.

f. Employment. The headquarters and headquarters detachment, motor transport group, is a command unit for motor transport operations. When three or more groups are required, they normally operate under a motor transport command or transportation brigade. A group headquarters may be assigned responsibility for an entire line haul or a segment of one.

77. Headquarters and Headquarters Company, Transportation Motor Transport Command (TOE 55-11)

a. Mission. The mission of the headquarters and headquarters company, transportation motor transport command, is to command, plan, supervise, coordinate, and control the activities of transportation motor transport groups and other assigned or attached units.

b. Assignment. The headquarters and headquarters company, motor transport command, is assigned to a field army or a theater army logistical command.

c. Capabilities. The headquarters and headquarters company, motor transport command, is capable of commanding three to seven motor transport groups and assigned or attached supporting units of other administrative or technical services.

d. Characteristics. The headquarters is administratively self-sufficient. Assigned transportation is used administratively in liaison

and supervisory missions. Additional motor transportation is required for unit movement of personnel and equipment.

e. Functions.

(1) The command headquarters consists of the commander and a deputy commander. The staff sections of the motor transport command assist the commander in formulating, interpreting, and disseminating policy and in supervising and directing operations and other activities of the headquarters as required.

(2) Operational functions of the motor transport command encompass all motor activities of the headquarters served. These functions are primarily of a planning and supervisory nature.

(a) Planning functions include—

1. Evaluation of motor transport requirements in tactical and logistical support of the forces involved.
2. Study of existing terrain, roadway, enemy situation, and other conditions affecting road movement.
3. Preparation of recommended policies dealing with motor transport matters for inclusion in the standing operating procedure of the headquarters to which assigned.
4. Determination of motor transport units required to accomplish the motor transport system.
5. Provision of military personnel and equipment, programing of training activities, and establishing of procedures for operation, maintenance, and supply.
6. Coordination with the appropriate civil affairs unit for the provision of civilian personnel and commercial transport equipment, programing of training, and establishment of procedures for operation.

(b) Supervisory functions include directing the execution of plans and assuring that they are adequately carried out. This is accomplished through—

1. Issuance of orders and pertinent directives to subordinate commands.
2. Constant attention to the progress of movements and other mission assignments.
3. Close liaison with units and installations serving the motor transport command and being served by it.
4. Inspection of various activities by the responsible sections of the headquarters to assure that subordinate units function properly.

f. Employment. The motor transport command is the senior motor transport unit. It is employed in the communications zone when more than two motor transport groups are required.

78. Headquarters and Headquarters Company, Transportation Brigade (TOE 55-62)

a. Mission. The mission of the headquarters and headquarters company, transportation brigade, is to command and control air transport, motor transport, terminal transfer, and transportation movement units.

b. Assignment. The headquarters and headquarters company, transportation brigade, is assigned to a field army support command.

c. Capabilities. The headquarters and headquarters company, transportation brigade, is capable of—

- (1) Commanding, planning, and supervising the activities of two to seven transport groups or the equivalent in transport battalions and companies.
- (2) Providing highway regulation service within the field army area.

d. Reference. For a detailed discussion of the transportation brigade, see FM 55-9.

APPENDIX I

REFERENCES

1. Field Manuals (FM)

5-20	Camouflage, Basic Principles and Field Camouflage
5-34	Engineer Field Data
5-35	Engineers' Reference and Logistical Data
5-36	Route Reconnaissance and Classification
8-35	Transportation of the Sick and Wounded
9-3	Ordnance Direct Support Service
10-50	Supply and Transport Battalion, Division Support Command
10-60	Supply of Subsistence in a Theater of Operations
19-2	Military Police Support in the Field Army
19-3	Military Police Support in the Communications Zone
19-25	Military Police Traffic Control
19-30	Physical Security
20-22	Vehicle Recovery Operations
21-5	Military Training
21-6	Techniques of Military Instruction
21-26	Map Reading
21-30	Military Symbols
21-40	Small Unit Procedures in Chemical, Biological, and Radiological (CBR) Operations
21-41	Soldier's Handbook for Chemical and Biological Operations and Nuclear Warfare
21-48	Chemical, Biological, and Radiological (CBR) and Nuclear Defense Training Exercises
21-60	Visual Signals
27-10	The Law of Land Warfare
30-5	Combat Intelligence
30-7	Combat Intelligence Battle Group, Combat Command, and Smaller Units
30-10	Terrain Intelligence
31-15	Operations Against Irregular Forces
31-16	Counter guerrilla Operations
31-22	U.S. Army Counterinsurgency Forces
31-25	Desert Operations
31-70	Basic Cold Weather Manual
55-4	Transportation Movements in Theaters of Operations
55-6	Transportation Services in Theaters of Operations
55-8	Transportation Intelligence
55-9	Transportation Services and the Transportation Brigade in the Field Army
55-10	Transportation Movements Services, Field Army
55-15	Transportation Reference Data
100-5	Field Service Regulations—Operations
100-10	Field Service Regulations—Administration

101-5	Staff Officer's Field Manual; Staff Organization and Procedure
101-10-1	Staff Officer's Field Manual; Organizational, Technical, and Logistical Data—Unclassified Data
FM 101-10-2	Staff Officer's Field Manual; Organizational, Technical, and Logistical Data—Extracts of Tables of Organization and Equipment

2. Technical Manuals (TM)

3-220	Chemical, Biological, and Radiological (CBR) Decontamination
9-500	Data Sheets Ordnance Type Materiel
9-1900	Ammunition, General
21-300	Driver Selection and Training (Wheeled Vehicles)
21-301	Driver Selection, Training, and Supervision; Tracked Vehicles
21-305	Manual for the Wheeled Vehicle Driver
21-306	Manual for the Tracked Vehicle Driver
38-750	Army Equipment Record Procedures

3. Army Regulations (AR)

55-26	Transportation Movements
55-162	Permits for Oversize, Overweight, or Other Special Military Movements on Public Highways in the Contiguous States and the District of Columbia of the United States
55-355	Military Traffic Management Regulation
58-1	Joint Procedures for Management of Administrative Use Motor Vehicles
190-5	Military Police, Motor Vehicle Traffic Supervision
190-15	Military Police, Traffic Accident Investigation
320-5	Dictionary of United States Army Terms
320-50	Authorized Abbreviations and Brevity Codes
345-210	Records Management Files Systems and Standards
380-5	Safeguarding Defense Information
380-55	Safeguarding Defense Information in Movement of Persons and Things
385-55	Prevention of Motor Vehicle Accidents
525-8	Use of Metric System for Linear Measurement in United States Army Operations
600-55	Motor Vehicle Driver—Selection, Testing, and Licensing
700-10	Registration of Motor Vehicles
725-50	Requisitioning, Receipt, and Issue System
735-31	Accountability for Vehicles in Relay Operations
735-35	Supply Procedures for TOE Units, Organizations, and Non-TOE Activities
746-5	Color and Marking of Army Materiel
750-1	Maintenance Concepts

4. Department of the Army Pamphlets (DA Pam)

108-1	Index of Army Motion Pictures, Filmstrips, Slides, Tapes, and Phono-Recordings
310-series	Military Publication Indexes
690-80	Administration of Foreign Labor During Hostilities

5. Tables of Organization and Equipment (TOE)

29-500	Composite Service Organization
55-11	Headquarters and Headquarters Company, Transportation Motor Transport Command
55-12	Headquarters and Headquarters Detachment, Transportation Motor Transport Group
55-16	Headquarters and Headquarters Detachment, Transportation Motor Transport Battalion
55-17	Transportation Light Truck Company
55-18	Transportation Medium Truck Company (Cargo)
55-19	Transportation Car Company, Army, Logistical Command, or Airborne Corps
55-28	Transportation Heavy Truck Company
55-62	Headquarters and Headquarters Company, Transportation Brigade
55-67	Transportation Light-Medium Truck Company
55-87	Transportation Motor Transport Company, Supply and Transport Battalion, Armored Division, or Transportation Motor Transport Company, Supply and Transport Battalion, Infantry Division (Mechanized)
55-88	Transportation Motor Transport Company, Supply and Transport Battalion, Infantry Division
59-97	Transportation Motor Transport Company, Supply and Transport Battalion, Airborne Division
55-500	Transportation Service Organization

6. Forms

DA Form 1317-R	Trailer Receipt
DA Form 1318-R	Daily Yard Check
DA Form 1319-R	Daily Outgoing Trailer Report
DA Form 1320-R	Weekly Trailer Location Report
DA Form 1660-R	Consolidated Operations Report
DA Form 2400	Equipment Utilization Record
DD Form 1265	Request for Convoy Clearance
DD Form 1384	Transportation Control and Movement Document

APPENDIX II

NATO STANDARDIZATION AGREEMENTS (STANAG's)

1. STANAG 2041, Operational Road Movements Orders, Tables and Graphs.

* * * * *

DETAILS OF AGREEMENT OPERATIONAL ROAD MOVEMENT ORDERS, TABLES AND GRAPHS

1. *General*

The Armed Forces of the North Atlantic Treaty Organization agree to use the standard layouts for Operation Orders for Road Moves, Road Movement Tables and Graphs as given in Appendices A to C. The instructions given in subsequent paragraphs are in amplification of these layouts.

2. *Orders*

Warning Orders and Operation Orders for road moves are of primary concern to those responsible for movement by motor transport. However, standing operating procedure/standing orders may also contain information vital to the conduct of movements by motor transport:

a. *Warning Orders*

- (1) A Warning Order is a preliminary notice of an order or action which is to follow. It is designed to give subordinates time to make necessary preparations.
- (2) A Warning Order is of value in alerting troops and preparing them for a move, before receipt of the detailed Operation Order for the move. A Warning Order may be issued orally or in message form. The fact that it is only a Warning Order will always be indicated.
- (3) As a general rule Warning Orders will follow the same sequence as an Operation Order, except that an Operation number will not be assigned.
- (4) Timeliness is the essence of Warning Orders.

b. *Operation Orders for Road Moves (see Appendix A)*

- (1) An Operation Order for a road move is an order issued by a commander covering the details for a move of his command by road.
- (2) The order should be issued in sufficient time to allow subordinates to make their plans, issue their orders, and complete their preparations for the move. The amount of detail given in such orders depends on the tactical and traffic situation, the state of training of the command, and the extent to which standing operating procedures/standing orders have been completed.

- (3) Fragmentary orders may be used; but when time permits, a detailed order is issued in the form of a five-paragraph Operation Order. Annexes to the order may include a road movement table, administrative/logistic annex etc. When administrative/logistic details are too voluminous for convenient inclusion in the order, and Administrative/Logistic Order or an Administrative/Logistic Annex to the Operation Order will be issued.

c. *Standing Operating Procedure/Standing Orders*

The following are some headings that may be used as a guide in drafting Standing Operating Procedures/Standing Orders for a formation HQ. This list is not complete and will vary with circumstances, particularly in different theatres of war.

- (1) Composition and duties of advance party.
- (2) Vehicle loads, including personnel.
- (3) Grouping of vehicles and group commanders.
- (4) Organization of columns.
- (5) Sign-posting and traffic control.
- (6) Responsibility for manning start point and release point.
- (7) Discipline; halts; lighting.
- (8) Action in the event of enemy attack.
- (9) Drill for establishing HQ on arrival.
- (10) Responsibility for issue of Operation Orders for moves for HQ.
- (11) Inspection of vacated office sites for security purposes.

3. *Road Movement Tables* (See Appendix B)

- a. Road Movement tables will consist of two parts, the first being 'data' paragraphs reflecting general information or information common to two or more serials. The second part is a list of serials together with all other necessary information, arranged in tabular form.
- b. These afford a convenient means of transmitting to subordinates their schedules and other essential detail pertaining to a road move. This is particularly so in cases where the inclusion of such detail in the body of the Operation Order would tend to complicate it or make it unduly long.
- c. They will frequently require a wider distribution than a normal Operation Order so that copies can be issued to movement control personnel, traffic posts, etc.
- d. They will be given Security Classifications in accordance with their contents, which will not necessarily be the same as that of the Operation Order.

4. *Road Movement Graphs* (See Appendix C)

- a. Road Movement graphs are used by staffs in planning and, when applicable, in Supervising and/or regulating complicated movements, and for providing a convenient means of recording actual moves of units over a period.
- b. The unit of measure to be used, i.e., Kilometres or Miles, will depend on the requirements of the authorities concerned. However, the resulting orders and instructions should reflect only one unit of measure.

EXAMPLE OPERATION ORDER FOR A ROAD MOVE
(intended as a guide only)

(SECURITY CLASSIFICATION)

Copy No. 4
21st Inf. Div.
YREVA, BLOKSKY,
011030 October 1956
OPS 27

Operation Order 14:

Map: BLOKSKY, 1/250,000 NOTKLOTS-DRAKCIR

Task Organization/Grouping: Annex A,

Task Organization/Grouping (NOT attached to this example).

Time Zone A.

1. SITUATION

- a. Enemy Forces: BLOKSKY 42nd Infantry Division (reinforced) is delaying advance of V Corps.
- b. Friendly Forces: V Corps attacks early 2nd January.
- c. Attachments and Detachments: None.

2. MISSION

21st Infantry Division moves from YREVA at 012020A January to NAEJ.

3. EXECUTION

- a. 121 Brigade moves RED route to DRAKCIR and WHITE route to vicinity of NAEJ.
- b. 221 Brigade moves BLUE route to NOTKLOTS and GREEN route to vicinity of NAEJ.
- c. 321 Brigade follows 121 Brigade.
- d. Division Artillery follows 221 Brigade.
- e. Division Troops follow 321 Brigade.
- f. Miscellaneous.
- g. Coordinating instructions.
 - (1) Annex B Movement Table (NOT attached to this example).
 - (2) First halt 012200A January.
 - (3) No weapons will be fired at aircraft unless attacked.

4. ADMINISTRATION AND LOGISTICS

Administrative/Logistic Order 19 follows.

5. COMMAND AND SIGNAL

- a. Continue radio silence.
- b. Division Headquarters. Head of Division Troops during move.

Acknowledge

AVERS

Annexes A—Task Organization
Grouping
B—Movement Table

} NOT attached Major-General
to this example

Distribution:

Authentication:

Appendix B to STANAG No. 2041

SPECIMEN ROAD MOVEMENT TABLE

(A guide only, will need adjustment to suit individual cases)

(SECURITY CLASSIFICATION)

Annex _____ to _____ (Formation/Unit)
Operation Order _____ dated _____

Maps _____

- | | | |
|--------------------|--|--|
| 1. Average Speed | 4. Routes (i.e. between Start Points) |) Connect with paragraph 3a. of Details of Agreement.
These routes and points are here described by grid references, Codewords, etc., and, if necessary, numbered or lettered for ease of reference in the columns below. |
| 2. Traffic Density | and Release Points)) | |
| 3. Halts | 5. Critical Points (See NOTE 4)) | |
| | (a) Start Points) | |
| | (b) Release Points) | |
| | (c) Other Critical Points) | |
| | 6. Main Routes to Start Points) | |
| | 7. Main Routes from Release Points) | |

Serial	Date	Unit/ Forma- tion	No. of Vehi- cles	Load Class of Heaviest Vehicles	From	To	Route	Route to Start Point	Critical Points			Route From Release Point	Remarks
									Ref.	Due (hrs)	Clear (hrs)		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(j)	(k)	(l)	(m)	(n)	(o)
See NOTE 5													

(SECURITY CLASSIFICATION)

- NOTES: 1. Only the minimum number of columns should be used. Any information which is common to two or more serials should be included under the 'data' paragraphs.
2. As the table may be issued to personnel concerned with control of traffic, the security aspect must be remembered. It may not be desirable to include dates or locations.
3. If the table is issued by itself, and not as an Annex to a more detailed order, the table must be signed or authenticated in the normal way.
4. 'Critical Point' is defined as 'a selected point along a route used for reference in giving instructions. It includes Start Points, Release Points and other points along a route where interference with movement may occur or where timings are critical'.
5. This will be the 'Movement Serial' defined as an 'element or group of elements within a series which is given a numerical or alphabetical designation for convenience in planning, scheduling or control of movement'.

DISTANCE IN KILOMETRES OR MILES (as required by authority concerned)

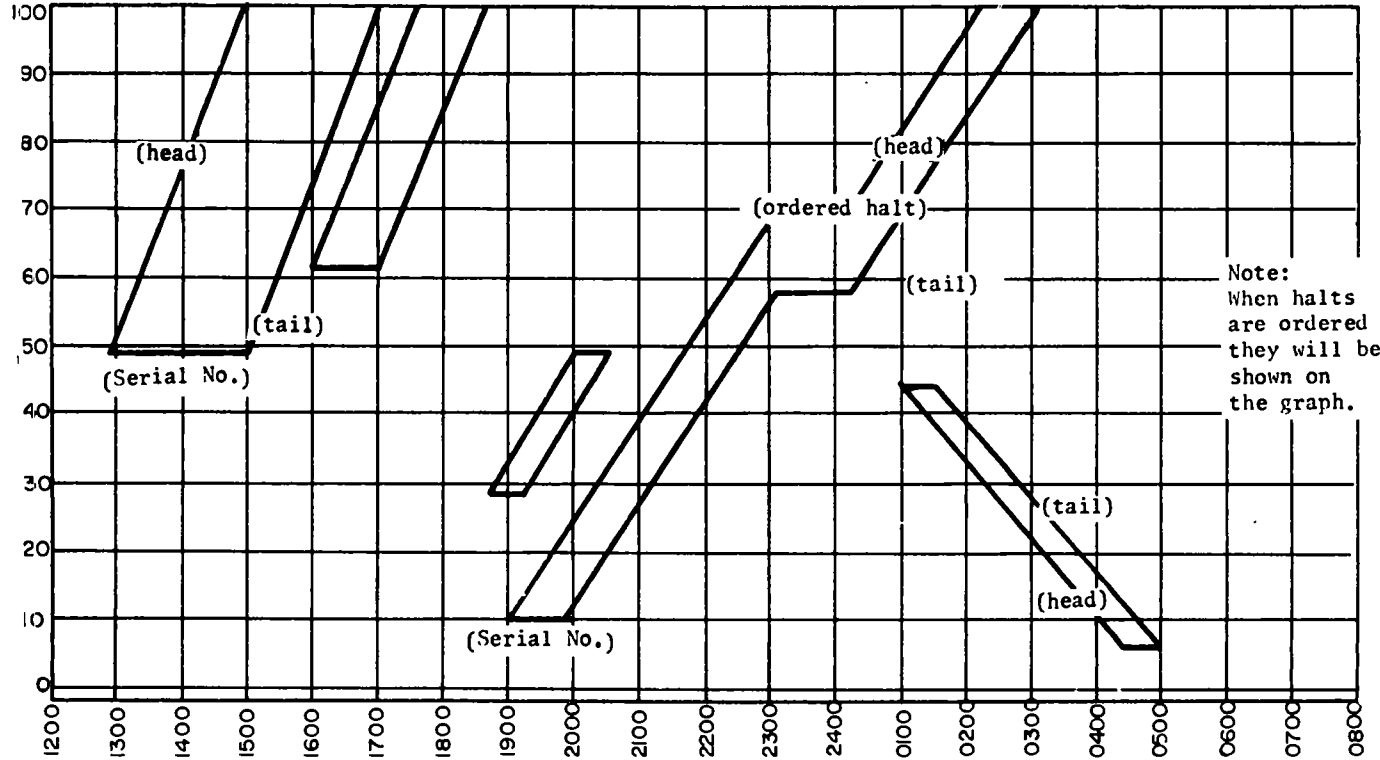
(SECURITY CLASSIFICATION)

EXAMPLE OF A ROAD MOVEMENT GRAPH

Appendix C to STANAG 2041

Designation of routes:

Period of time covered:



Appendix C to STANAG 2041.

2. STANAG 2151, Road Network—Definitions and Characteristics

* * * * *

DETAILS OF AGREEMENT ROAD NETWORK—DEFINITIONS AND CHARACTERISTICS

GENERAL

1. The NATO Armed Forces agree to adopt the following definitions in connection with the use of the road network and to evaluate the potential of this network in accordance with the characteristics indicated below.

DEFINITIONS

2. a. *The basic military road network* includes all routes designated in peacetime by the host nations to meet the anticipated military movements and transport requirements, both allied and national.
b. The basic network should already, in peacetime, have sufficient capacity and be equipped with the necessary facilities. NOTE (for information): There is a basic CENTRAL EUROPE military road network formed from national networks.
3. a. *A military road manoeuvre network* is the road system required by a commander for the conduct of a specific operation and for the required logistical support for that operation.
b. It is built up from the corresponding basic military road network the routes of which form the framework of the military manoeuvre nets, taking into consideration such addition or alternatives as may be required by circumstances and the needs of the Command. This network is defined and controlled (allotment of movement credits) by the military authorities, national or allied, according to the break-down of responsibilities in the theatre of operations (Communication Zone, Rear and Forward Combat Zone).
4. *Axial routes* ("penétrans" or "axiales"). This term denotes the routes running through the rear area and into the forward area. They are identified by odd numbers and shown on overlays by unbroken lines.
5. *Lateral routes* ("latérales" or "rocares"). This term denotes the routes, the general direction of which is roughly parallel to the *frontline*, which feed into or cross axial routes. They are identified by even numbers and shown on overlays by broken lines.
6. *Traffic flow* ("débit d'un itinéraire") is the total number of vehicles passing a given point in a given time. Traffic flow is expressed as vehicles per hour, (V.P.H.).
7. *Road capacity in vehicles or tons* ("capacités routières en véhicules ou en tonnes"). The road traffic which may use a road, is variable. The maximum capacity either for the flow of vehicles or for the tonnages carried are important data for transportation planning. These maxima are defined below:
 - a. *The road capacity in vehicles* ("capacité en véhicules ou le débit maximum") is the maximum number of vehicles that can pass over a particular road or route in the same direction within a given time. It is generally expressed in vehicles per hour (V.P.H.) ("Véhicules par heure"). The road capacity cannot be

greater than the maximum traffic flow at its most restricted point ("point critique").

- b. *The road capacity in tons* ("capacité en tonnes") is the maximum number of tons which can be moved over a particular road or route in the same direction within a given time. It is generally expressed in tons per hour and is the product of V.P.H. and the average payload of the vehicles using the route (e.g. 200 V.P.H. $\times$ 3 T. = 600 Tons per hour).
 - c. *Complementary remarks.* Estimates of traffic flows and/or tonnage capacity should take into account the existing conditions. They may include:
 - (1) road characteristics (terrain, type of roadway, number of lanes available, road maintenance, rated tonnage capacity of of the weakest bridge);
 - (2) military traffic regulations (density, speed limits, direction of traffic);
 - (3) types of vehicles employed;
 - (4) movement conditions (by day, by night, lighting and/or weather conditions).
8. *A controlled route* ("itinéraire réglementé") denotes a route the use of which is subject to traffic or movement restrictions. ("Movement Credit" mentioned below is defined in STANAG 2154).
- a. *A supervised route* ("itinéraire surveillé") is a roadway over which control is exercised by a traffic control authority by means of traffic control posts, traffic patrols or both. A "Movement Credit" is required for its use by a column of 10 or more vehicles or by any vehicle of exceptional size or weight.
 - b. *A despatch route* (UK: "regulated route"; FR: "itinéraire gardé") is a roadway over which full control, both as to priorities of use and the regulation of movement of traffic in time and space is exercised. A "Movement Credit" is required for its use by any independent vehicle or group of vehicles regardless of number or type.
 - c. *A reserved route* ("itinéraire réservé ou spécialisé") is a controlled route the use of which is:
 - (1) allocated exclusively to a particular authority or formation ("itinéraire reserve") e.g. route reserved for the 10 Division, or
 - (2) intended to meet a particular requirement ("itinéraire spécialisé") e.g. route reserved for evacuation.
9. *An open route* ("itinéraire libre") is a route for the use of which no "Movement Credit" is required.
10. *A one way road* ("itinéraire à sens unique") is a road on which vehicles may move in one direction only at a particular time.
11. *A signed route* ("itinéraire fléché") is a route of one of the above categories along which a unit has placed, on its own initiative, for its exclusive use, and under the conditions prescribed by the Command or the manoeuvre regulations, directional signs which include the identification symbol of the unit concerned.

12. *Route where guides are provided* ("itinéraire jalonné"). This term denotes a route included in one of the above categories on which a unit has placed, under its own initiative and for its exclusive use and under the conditions prescribed the Command or the manoeuvre regulations, guides responsible for showing the vehicles of that unit the direction they are to follow: these guides direct the personnel and vehicles of their own formation but do not give any indication to personnel and vehicles of other units who must respect the common signing and regulations.

13. *Prohibited route* ("itinéraire interdit") or *prohibited section of route* is a route or section of route over which traffic is prohibited, whatever its nature.

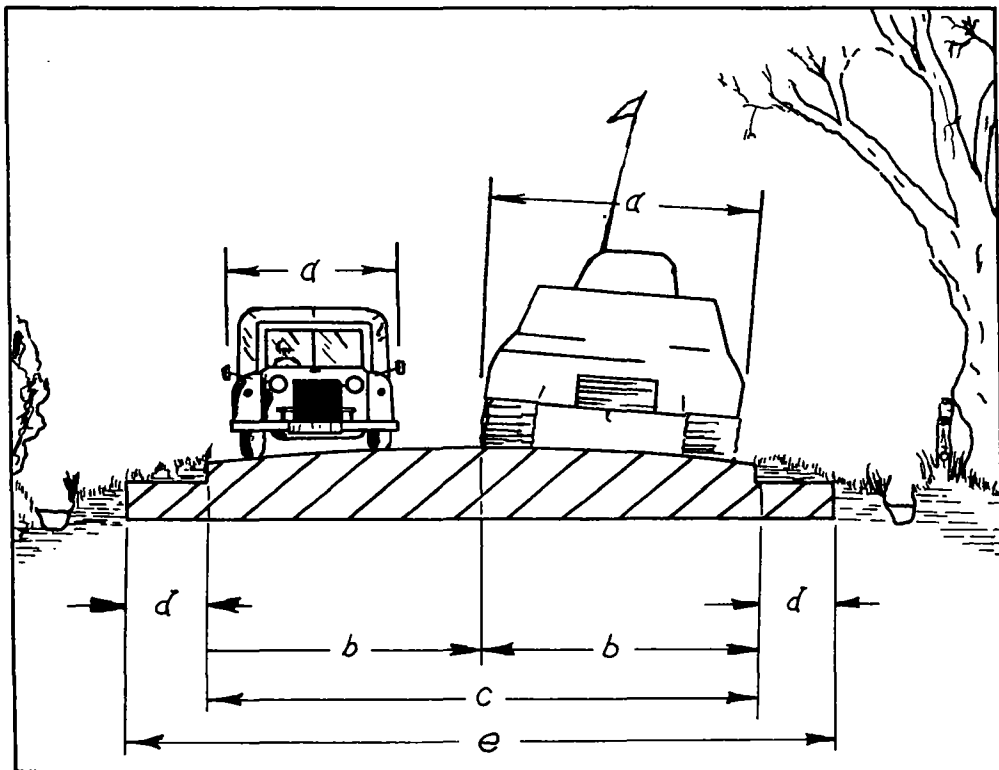
CHARACTERISTICS

14. The characteristics of a route are in particular:

- a. the width of the travelled way (UK: "carriage way");
- b. the clearance of obstacles (e.g. tunnels, bridges, etc.);
- c. the class of loads which can be accepted in accordance with STANAG 2021 (Edition No. 2).

WIDTHS

15. a. The various widths of a road are illustrated in the drawing below:



LEGEND

- a. width of vehicle.
- b. " " lane.
- c. " " travelled way (UK: "carriage way").
- d. " " hard shoulder.
- e. " " grading.

Various widths of a road.

15. b. The number of lanes is determined by the width of the travelled way; i.e. the subdivision of the travelled way to allow the movement of a single line of vehicles. Taking into account the width of a normal vehicle and the space required on either side of that vehicle, the width of the lane required for the movement of one column is normally estimated at 11½ feet (3.50m) and 13 feet (4m), for a tracked combat vehicle. A single lane road can only be used in one direction at any one time.
- c. The traffic flow is determined by the number of lanes.
- (1) A route or road is *single flow* ("simple courant") when it allows a column of vehicles to proceed and, in addition, isolated vehicles to overtake or to pass in the opposite direction, at predetermined points. It is desirable that the width of a single flow road be equal to at least 1½ lanes.
 - (2) A route or road is *double flow* ("double courant") when it allows two columns of vehicles to proceed simultaneously. It is essential that the width of a double flow road be equal at least to 2 lanes.
15. d. In the light of the above definition, the traffic possibilities can be shown in the following table:

TRAFFIC FLOW POSSIBILITIES	ROAD WIDTHS FOR NORMAL VEHICLES ONLY	ROAD WIDTHS FOR TRACKED COMBAT VEHICLES
Isolated vehicles of appropriate width only and in one direction only.	At least 11½ ft., (3.50m)	At least 13 ft., (4m)
Generally one way only; no overtaking or passing in opposite direction.	Between 11½ ft., and 18 ft. (3.50m and 5.50m)	Between 13 ft., and 19½ ft., (4m and 6m)
Single flow	Between 18 ft., and 23 ft. (5.50m and 7m)	Between 19½ ft., and 26 ft., (6m and 8m)
Double flow	Over 23 feet (7m)	Over 26 ft., (8m)

HEIGHT

16. The height allowed for clearing overhead obstacles is that which separates the travelled way from a line drawn horizontally under the summit of the overhead obstacle. It is a definite limit prohibiting the use of a route to all vehicles which exceed that height, with or without a load.

CLASS

17. a. *Route*. The class of a route is fixed in relation to the heaviest gross weight vehicle the route will accept. In such a case the choice of the route is limited (see STANAG 2021 (Edition No. 2)).
- b. *Network*. The class of a network is fixed in relation to the minimum route classification in that network.
18. To facilitate movement those routes included in a low class network but over which heavier equipment can be moved are re-grouped in broad categories:

Average traffic routes	: Class 50
Heavy traffic routes	: Class 80
Very heavy traffic routes	: Class 120

19. Whenever possible, the basic military road network is composed of average routes (Class 50) and includes a certain number of heavy traffic routes and a few very heavy traffic routes.

3. STANAG 2154, Definitions and Regulations for Military Motor Movements by Road

* * * * *

DETAILS OF AGREEMENT DEFINITIONS AND REGULATIONS FOR MILITARY MOTOR MOVEMENTS BY ROAD

Enclosure: Annex 'A'—Direction arrow.

AIM

1. It is agreed to adopt for the use of NATO Armed Forces the definitions and regulations applying to military motor movements by road, defined in the following paragraphs.

ORGANIZATION OF COLUMNS

2. A "column" of vehicles is a group of at least ten vehicles moving under a single commander, over the same route, in the same direction.
3. A large column may be composed of a number of organized elements (sub-units, march units, sections of vehicles, etc.).
4. Each column and each organized element of the column must include:
 - a. a commander whose place may vary;
 - b. in the first vehicle: a subordinate commander known as the "pace setter" (in French: guide);
 - c. in the last vehicle: a subordinate commander known as the "trail officer" (in French: serra-file).
5. The pace setter of the first element of a column leads it and regulates its speed. The trail officer of the last element deals with such problems as occur at the tail of the column.
6. In addition, each vehicle will have a "vehicle commander" (who may be the driver).

IDENTIFICATION OF COLUMNS—MOVEMENT CREDIT

7. Each column will be identified in accordance with STANAG 2027—i.e. blue flag on leading vehicle, green flag on last vehicle. In addition, when movement is being carried out at night, the commander (driver) of the leading vehicle will carry a torch giving a blue light and the commander (driver) of the last vehicle a torch giving a green light.
8. Additionally, each column will be identified by a number known as "movement number" or "identification serial number" which is allocated

at the same time as the "movement credit" by the authority organizing the movement (see paragraph 10 below). This number will identify the column during the whole of the movement.

9. The number will be placed on both sides and, if possible, on the front of all vehicles composing the column so as to be clearly visible. It will be composed of:

- a. Two figures indicating the day of the month on which the movement is due to commence.
- b. Three or four letters indicating the authority organizing the movement. The first two letters will be the national symbols shown in STANAG 1059, (Edition No. 2).
- c. Two figures indicating the serial number allocated by the authority responsible for the movement.
(Example: identification 03-BEA-08 will indicate that Column No. 8 will be moved by a Belgian authority on the 3rd day of the current month).
- d. The elements of a column may be identified by adding a letter behind the movement number.

10. *Movement credit—Time allocation* (Crédit de mouvement)

- a. A movement credit is the time allocated to one or more vehicles to move over a supervised despatch or reserved route as defined in STANAG 2151, paragraph 8.
- b. Besides the allocation of a "movement number" or "identification serial number" (see paragraph 8 above), a movement credit includes the indication of times at which the first and the last vehicle of the column are scheduled to pass:
 - (1) the entry point, that is to say the point where the column enters the controlled route;
 - (2) the exit point, that is to say the point where the column leaves the controlled route.

TIME AND DISTANCE FACTORS IN MOTOR COLUMNS

11. *Vehicle distance*—(French: "distance"), is the space between two consecutive vehicles of an organized element of a column.

12. *Column gap*—(French: "créneau"), is the space between two organized elements following each other on the same route. It can be calculated in units of length or in units of time as measured from the rear of one element to the front of the following element.

13. *Traffic density*—(French: "densité de la circulation"). The average number of vehicles that occupy one mile or one kilometer of road space, expressed in vehicles per mile (VPM) or per kilometer (VPK).

14. *Length of a column*—(French: "longueur d'encombrement"), is the length of roadway occupied by a column in movement including the gaps inside the column measured from front to rear inclusive.

15. *Pass time*—(French: "durée d'écoulement"), of a column is the actual time between the moment when the first vehicle passes a given point and the moment when the last vehicle passes the same point.

16. *Road clearance time*—(French: “durée d’encombrement”), is the total time a column requires to travel over and clear a section of road.

FORMATION AND DISPERSAL OF COLUMNS

17. *Start Point*—(French: “point initial”) is a well defined point on a route at which a movement of vehicles begins to be under the control of the Commander of this movement. It is at this point that the column is formed by the successive passing, at an appointed time, of each of the elements composing the column. In addition to the principal start point of a column there may be secondary start points for its different elements.

18. *Release Point*—(French: “point de dislocation”) is a well defined point on route at which the elements composing a column return under the authority of their respective commanders, each one of these elements continuing its movement towards its own appropriate destination. In addition to the principal release point of a column, there may be several secondary release points for the various elements.

SPEED AND FLOW OF COLUMNS

19. *Speed*—(French: “vitesse instantanée”) indicates the actual rate of speed of a vehicle at a given moment, as shown on the speedometer (in kilometers/hour or miles/hour).

20. *Pace*—(French: “vitesse de marche”) is the regulated speed of a column or element as set by the pace setter in order to maintain the average speed prescribed.

21. *Rate of march*—(French: “vitesse moyenne”) is the average number of miles or kilometers travelled in any given period of time, including short periodic halts and other short delays. It is expressed as miles or kilometers in the hour.

22. *Average speed*—(French: “vitesse de croisière”) is the average number of miles or kilometers travelled per hour, calculated over the whole journey, excluding specifically ordered halts.

ROUTE SIGNING AND ROAD GUIDES

23. STANAG 2151 gives definition of a “signed route” and of a “route where guides are provided.”

24. Signing and guide teams are normally provided by the moving unit (see paragraph 27 below). Members of these teams must not, under any circumstances, wear the armbands and cuffs specified in STANAGs 2025 (Edition No. 2) and 2159. They may wear coloured armbands.

25. Direction arrows used should preferably be black on white background and bear the identification symbol of the unit in question (distinctive sign or identification number). They may be of a similar type to those shown in Annex ‘A’. Before crossroads leading to several directions, a warning arrow can be used (type similar to that shown in Annex ‘C’ to STANAG 2012 (Edition No. 2)).

26. Unit route signs and unit guides are placed a short time in advance of the column and picked up by the trail officer.

27. Route signing and the placing of guides on controlled routes must be under the responsibility of the authority in charge of movements or traffic in the area concerned.

28. Outside these itineraries, the tasks above will be the responsibility of the column commander.

SPECIAL REGULATIONS FOR THE EXECUTION OF MOVEMENTS

29. All personnel exercising a command in the column and all drivers must strictly obey the instructions of traffic control and regulating personnel.

30. When approaching a traffic control or a regulating post indicated by prescribed signs (STANAGs 2025 and 2012 (Editions No. 2)) the column commander or his representative must advance ahead of his column and report to the regulating post commander to:

- a. give the required information concerning his organized elements and their movements;
- b. receive information and possible instructions.

31. Through this post, he can also arrange for the transmission of his own instructions, or information, to the various elements of his column as they pass the post, where however *they must not stop unless ordered to do so.*

HALTS

Short Halts

32. Short halts on the manoeuvre network itineraries will normally last ten minutes and take place, in principle, every two hours, ten minutes before the full hour. All columns following the same itinerary will stop at the same time, following the orders given by the authority responsible for the regulation of traffic in the area in question.

Long Halts

33. No standard rules for the observance of long halts are laid down. They must always be specifically plotted on movement graphs in order to avoid possible conflict.

34. Particular attention will be paid to the following aspects of traffic discipline:

- a. Any isolated vehicle or vehicles forming part of a column, when making a long halt, should move off the road as much as possible.
- b. If this practice cannot be observed (the commander of a column which is halted on an itinerary must take all necessary measures to facilitate circulation for other road users and avoid accidents or traffic jams. The measures to be taken will vary according to the road conditions and width of the route;
 - (1) warning, at a sufficient distance from the front and rear of the column (guards, warning flags, lights or flares, security permitting);
 - (2) if required, organize (direct) a system of one way traffic alternately along the columns etc.

- c. When a halted column resumes movement it has the right of way unless otherwise prescribed.

OVERTAKING OF COLUMNS

35. *By isolated vehicles*

- a. An isolated vehicle is only authorized to overtake a moving column:
 - (1) if its maximum *authorized* speed is higher than the speed at which the column is moving;
 - (2) if there is sufficient distance between the vehicles of the column to allow the overtaking vehicle to regain its position in the proper lane after overtaking each vehicle;
 - (3) if the trail officer of the column gives a clear signal that overtaking is possible.
- b. In all other cases, an isolated vehicle will only overtake the column when the latter is halted.

36. *By other columns*

- a. On a *controlled route* a column may only overtake another column on the orders of the movements authorities and as arranged by the traffic regulating personnel.
- b. On an *open route* no column may overtake another moving column, except in special cases, e.g. on a one-way road wide enough. In these cases, the Commander of the column desiring to pass will contact the Commander of the column to be passed prior to effecting passage.
- c. Outside these special cases, the overtaking of a column by another column is only authorized if the *former is halted* and providing the moving column has the time to overtake the whole of the halted convoy before the latter is ready to move on. In this case, the Commander of the column desiring to pass will contact the Commander of the column to be passed prior to effecting passage. The Commander of the halted column after giving his agreement must facilitate the overtaking.

MOVING BY NIGHT (Reference: STANAG 2024 (Edition No. 2))

37. By night, road movements are carried out according to traffic regulations as follows:

- a. with normal lighting, or
 - b. reduced lighting, or
 - c. black-out lighting, or
 - d. without lights, or
 - e. possibly with "balisage"
- From a certain line
or on certain routes
specified by orders.

Note: "Balisage" is a method of marking the road by lights for driving under black-out conditions.

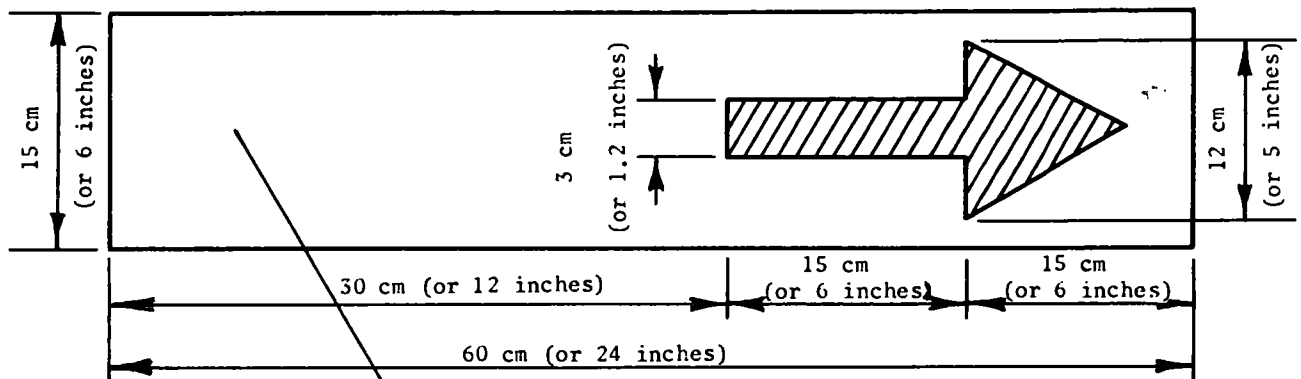
- 38. When columns are moving under black-out conditions, traffic normally *will be one-way*.

DIRECTION ARROW

(made of paper, synthetic matter or wood.....)

FLECHE DE DIRECTION

(réalisée en papier, en matière synthétique ou en bois.....)



SPACE FOR PRINTING THE SYMBOLS

SPACE DISPONIBLE POUR LES SYMBOLES

Annex A to STANAG 2154, direction arrow.

4. STANAG 2163, Vehicle Weight and Dimension Card

* * * * *

DETAILS OF AGREEMENT**VEHICLE WEIGHT AND DIMENSION CARD**

Enclosure: Annex "A"—Sample of Card.

AGREEMENT

1. The NATO Armed Forces agree to adopt for the transportation of their vehicles the card as described hereunder.

DETAILS

2. The layout of the front and back of the vehicle weight and dimension card is given in Annex "A".
3. The front will be printed *white on a black background*.
4. The back will be printed black on a white background.
5. The border of the front will be gummed so as to facilitate fixing to windscreens.
6. The card is to be printed in both of the official NATO languages (English and French) and in the language of the country of origin if other than English and French.
7. The size of the card is 9½ inches (24 cm) x 7¼ inches (18 cm).

METHOD OF EMPLOYMENT

8. The method by which the card will be employed is shown on the reverse of each card.
9. When printed forms are not immediately available, a substitute card printed and completed black on a white background may be used.

VEHICLE WEIGHT AND DIMENSION CARD

FICHE DE DIMENSIONS ET DE POIDS DU VEHICULE

----- (3rd language/3ème langue)

State unit of measure used.

Préciser l'unité de mesure utilisée

----- (3rd language/3ème langue)

WEIGHT

POIDS

----- (3rd language/3ème langue)

LENGTH

LONGUEUR

----- (3rd language/3ème langue)

BREADTH

LARGEUR

----- (3rd language/3ème langue)

HEIGHT

HAUTEUR

----- (3rd language/3ème langue)

GROUND PRESSURE OR MAXIMUM
AXLE LOAD

PRESSION UNITAIRE OU POIDS DE
L'ESSIEU LE PLUS CHARGE

----- (3rd language/3ème langue)

Directions for Use

Mode d'emploi

1. This card is designed to display vehicle laden weight and dimensions to all concerned with loading it on any means of transport eg. to an aircraft, ship, etc.
1. Cette fiche est destinée à indiquer le poids en charge et les dimensions d'un véhicule à tous ceux qui peuvent être responsables de son chargement sur n'importe quel mode de transport, par exemple: avion, navire, etc.
1. ----- (3rd language/3ème langue) -----
2. Accurate weight and dimensions will be printed *in chalk* by the unit or depot preparing a vehicle for movement. This card will then be fixed *inside* the windscreen on the passenger's side. On tanks or other vehicles without windscreens, this card will be fixed on a suitable surface on the opposite side of the vehicle from the driver's seat, where it can easily be seen. If possible, it should be protected from inclement weather.
2. Le poids et les dimensions exacts seront indiqués *à la craie*, en lettres majuscules, par l'unité ou le dépôt préparant le véhicule en vue de son transport. Cette fiche sera ensuite apposée *à l'intérieur* du pare-brise, du côté du passager. Dans le cas des chars ou autres véhicules sans pare-brise, la fiche sera apposée sur une surface appropriée sur le côté du véhicule opposé à celui du siège du conducteur et dans une position facilement visible. Si possible, la fiche doit être à l'abri des intempéries.
2. ----- (3rd language/3ème langue) -----
3. This is a NATO form and whoever "chalks in" the weights and dimensions should use his country's normal system of weight and measurement.
3. Cette fiche est un formulaire OTAN et la personne chargée d'inscrire à la craie le poids et les dimensions du véhicule doit utiliser le système normal de poids et mesures de son propre pays.
3. ----- (3rd language/3ème langue) -----

APPENDIX III

METRIC CONVERSION TABLE

Kilometers to miles
 $(\text{km} \times .621 = \text{mi})$
 $(\text{km} \div 1.609 = \text{mi})$

1	=	.62
2	=	1.22
3	=	1.86
4	=	2.48
5	=	3.10
6	=	3.72
7	=	4.34
8	=	4.96
9	=	5.58
10	=	6.20
20	=	12.42
30	=	18.63
40	=	24.84
50	=	31.05

Miles to kilometers
 $(\text{mi} \times 1.609 = \text{km})$
 $(\text{mi} \div .621 = \text{km})$

1	=	1.60
2	=	3.21
3	=	4.82
4	=	6.43
5	=	8.04
6	=	9.65
7	=	11.26
8	=	12.87
9	=	14.48
10	=	16.09
20	=	32.18
30	=	48.27
40	=	64.36
50	=	80.45

APPENDIX IV

TYPE TIME-DISTANCE TABLE

The table below may serve as a guide in planning motor transport movements. A tabular listing is given of the time required for vehicle(s) to move a specified distance at specific speeds and rates of march. Planners can modify the table to suit their specific needs.

Time-Distance Table for Selected Vehicle Speeds

Distance		Travel time ¹					
		Rate		Rate		Rate	
		10 MPH (7.5 MIH) 16 KPH (12 KIH)		20 MPH (15 MIH) 32 KPH (24 KIH)		30 MPH (25 MIH) 48 KPH (40 KIH)	
Km.	Mi.	Hr.	Min.	Hr.	Min.	Hr.	Min.
1		0	5	0	2.5	0	1.5
	1	0	8	0	4	0	2.4
2		0	10	0	5	0	3
3		0	15	0	7.5	0	4.5
	2	0	16	0	8	0	4.8
4		0	20	0	10	0	6
	3	0	24	0	12	0	7.2
5		0	25	0	12.5	0	7.5
6		0	30	0	15	0	9
	4	0	32	0	16	0	9.6
7		0	35	0	17.5	0	10.5
8		0	40	0	20	0	12
	5	0	40	0	20	0	12
9		0	45	0	22.5	0	13.5
	6	0	48	0	24	0	14.4
10		0	50	0	25	0	15
	7	0	56	0	28	0	16.8
	8	1	4	0	32	0	19.2
	9	1	12	0	36	0	21.6
	10	1	20	0	40	0	24
20		1	40	0	50	0	30
30		2	30	1	15	0	45
	20	2	40	1	20	0	48
40		3	20	1	40	1	0
	30	4	0	2	0	1	12
50		4	10	2	5	1	15
	40	5	20	2	40	1	36
	50	6	40	3	20	2	0

¹ The MPH figure indicates vehicle speed (miles per hour), and the MIH figure the rate of march for that speed (miles in the hour).

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:

J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

DCSPER (2)
DCSOPS (2)
DCSLOG (5)
ACSI (2)
ACSFOR (2)
CINFO (1)
TAG (1)
TJAG (1)
TPMG (1)
TSG (1)
CofEngrs (1)
CofCh (1)
OPO (1)
USACDC Agcy (3) except
 USACDCTA (7)
USCONARC (10)
USAMC (2)
USACDC (2)
USACDCEC (10)
ARADOM (1)
OS maj Comd (5)
LOGCOMD (5)
Armies (10) except
 OS Armies (25)
Corps (3)
Div (10)
Bde (1)
Regt/Gp (1)

Bn (5)
Army Dep (2)
Dep (OS) (2)
USAWC (5)
USACGSC (50)
USMA (10)
Br Svc Sch (5) except
 USAARMS (50)
 USAES (20)
 USAQMS (10)
 MFSS (20)
 USACMLCS (8)
 USASCS (15)
USACDCCISG (6)
Units org under fol TOE:
55-11 (5)
55-12 (5)
55-16 (5)
55-17 (5)
55-18 (5)
55-19 (5)
55-28 (5)
55-67 (5)
55-87 (5)
55-88 (5)
55-97 (5)
55-500 (GA,GB) (5)

NG: State AG (3); unit—same as Active Army except allowance is one copy to each unit.

USAR: Units—same as Active Army except allowance is one copy to each unit. For explanation of abbreviations used, see AR 320-50.

☆ U.S. Government Printing Office: 1965—750-548/9192A

3000021317

FM 55-35 MOTOR TRANSPORT OPERATIONS AND MOTOR TRANSPORT UNITS—1965

